

**IMPLEMENTATION OF WASTE MANAGEMENT POLICY IN THE CITY OF
TSHWANE**

By

THABO MOKEBE

STUDENT NUMBER: 33241902

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SUPERVISOR: MR B.C LEKONYANE

STUDENT NUMBER: 33241902

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DECLARATION BY STUDENT

I **Thabo Mokebe** an MPA student, : student number **33241902** hereby declare that the dissertation submitted for the degree Master in Public Administration: Implementing the Waste Management Policy: The Case Study of the City of Tshwane at the University of South Africa, is my own original work and has not been previously submitted to any other institution of higher education. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references.

T Mokebe

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ABSTRACT

The City of Tshwane is the capital city of South Africa and the administrative seat of government. The status of the city as a capital creates high expectations on the level of basic service delivery on municipal services like waste management, water, electricity and health. The city is currently facing challenges in relation to the delivery and implementation of waste management services. In an attempt to find solutions to the waste management challenges of the city a study on the implementation of waste management services is undertaken by the researcher. The study identifies and then analyses the underlying reasons for the challenges faced by the City of Tshwane in the implementation of waste management services.

This aim of this study was to investigate and to analyse the implementation of waste management services in the City of Tshwane's historically disadvantaged areas with particular focus on Region 01, 02, 05 and 07. In order to investigate these factors, a descriptive research design and qualitative methodology was used which related to convenient and purposive sampling of officials and data collected from fifteen (15) respondents using semi structured interviews and observations. The study also utilised document analysis to interpret the challenges and solutions related to the research topic.

It emerged from the study that a lack of capacity and resources to perform efficient waste management services underpinned many of the challenges experience by the city. The failure of the city to ensure community participation and involvement is another reason for the challenges the city faces in waste management. Furthermore, the lack of policy implementation and enforcement is an element that the city needs to deeply consider. When policy is crafted with input of residents and when there is a social contract as to the roles and responsibilities of each party, it becomes easier to enforce.

Some of the challenges that the city faces with regards to waste management can also be attributed to political interference and institutional deficiencies. Beyond issues like capacity, institutions and others, the city will continue to face challenges if it does

not seriously invest in innovation and new technologies that address its generic and specific conditions in relation to the management of waste.

The marginalisation and selective enforcement of by-laws on the informal recyclers and reclaimers are some of the findings of the study that demonstrate the inability of the city to find specific solutions to specific regions on waste management. These challenges resulted in the peri urban regions like region 01, 02, 05 and 07 not receiving quality and consistent waste management services.

The study recommends some interventions to address the waste management problems identified in the highlighted regions and entire City of Tshwane. Some of the recommended interventions include, assessing the unique characteristics of the communities and regions with a view of identifying waste management solutions that will be relevant for the circumstances and profile of such regions, ensure that proper and adequate resources, infrastructure and capacity is deployed to such areas to improve the waste services in those areas. Furthermore aggressive education and awareness campaigns conducted in partnership with communities will be critical to change people's attitude towards waste management and a clean environment. This can be achieved through a consultative process led by the City of Tshwane in partnership with its communities and enforced through a progressive and incentive driven by-law system.

KEY TERMS: Public Policies, Service delivery, Legislation, Landfilling, Service Delivery Protests, Waste Management, Integrated Development Planning, Waste Hierarchy, Green Economy, Waste to Energy.

ABBREVIATIONS

CBD	Central Business District
CoT	City of Tshwane
CoJ	City of Joburg
DEA	Department of Environmental Affairs
DWAF	Department of Water Affairs and Forestry
FCA	Full Cost Accounting
IDP	Integrated Development Plan
IndWMP	Industrial Waste Management Plan
IWMP	Integrated Waste Management Plan
GDARD	Gauteng Department of Agriculture and Rural Development
HCRW	Health Care Risk Waste
MRF	Material Recovery Facility
NEM:WA	National Environmental Management: Waste Act
NWMS	National Waste Management Strategy
REDISA	Recycling and Economic Development Initiative of South Africa
SMME(s)	Small, Medium & Micro Enterprise(s)
WMD	Waste Management Division
WMO	Waste Management Officer
WMIS	Waste Management Information System

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

The advent of democracy ignited hopes for a better life for all South Africans. When the African National Congress (ANC) was voted into government in 1994, one of its goals was to redress the imbalances of the past and ensure wide access to basic services delivery to all South Africans. Indeed, this was an expectation for the majority of previously dispossessed citizens and it continues to be so presently. Government's commitment to ensuring access to services and a "good life" is well documented in the Constitution of the Republic of South Africa, 1996 the Reconstruction and Development Programme (RDP), Growth Employment and Redistribution (GEAR). Despite government's promise and efforts to improve the lives of poor South Africans, service delivery backlogs remain a harsh reality and this requires urgent attention.

Still, over the past twenty years communities have witnessed improvements in access to housing, electricity, water, sanitation, waste refusal and health care. According to the Statistics South Africa's Census of 2011, 73% of the population had access to piped water inside their dwelling against 60.8% that was recorded in the 1996 census, 57% had access to flushing toilets against 49.1 and 84.7% had access to electricity compared to 49% recorded in the census 1996.

Despite these recorded improvements, there has been a worrying trend in the poor delivery of waste management services in the so-called townships, rural and peri urban areas of the country. This has resulted in perceptions that waste management services are only delivered to affluent areas and the historically disadvantaged areas do not have access to such services. This situation has resulted in continuous service delivery protests in most of the historically disadvantaged areas of the country and cities.

This research will seek to understand and investigate the perceptions, nature and complexity of local government service delivery challenges with specific focus on waste management. The study area or region of the study will be the City of Tshwane

as a capital city and the second highest host of international embassies. This means that the profile and character of South Africa will always be benchmarked on the profile of its capital and it is for this reason that the cleanliness and equitable delivery of services to its communities is critical to its image and that of the country.

Furthermore, South Africa as a signatory to the Polokwane Declaration signed in September 2001 committed to achieving 50% reduction in the volume of waste generated and 25% reduction in volumes of land-filled waste by 2012 and a zero waste plan by 2022. According to the National Waste Information Baseline report (2014), South Africa generated approximately 108 million tonnes of waste in 2011 of which 98 million was disposed of at landfill and 10% of all waste generated in South Africa was recycled. This basically demonstrate that South Africa is still heavily reliant on landfilling as a waste management option and falling short of meeting the Polokwane Declaration targets. The failure of South Africa to comply with its international obligations is reflected on the efforts and commitment of its different tiers of government at national, provincial and local level. The delivery of waste management services is an exclusive local government competency, therefore it is critical to interrogate the waste management services of the capital city of South Africa in order to get an understanding of the broader and different challenges of local government in delivering waste management services.

1.2 BACKGROUND

Apartheid's segregationist policies institutionalised racialized development (Section A1 of the White Paper on Local Government – WPLG – 1998). The Group Areas Act (Act 77 of 1957) was a key piece of legislation that apartheid deployed to institute strict residential segregation and saw the compulsory transfer of Black Africans people to the so called “own group areas”. Various other acts were promulgated to entrench racialized discrimination and different government structures to govern Black/Bantu areas as well as separate amenities for the different race groups.

This policy of segregation, “own management for own areas”, together with the policy of influx control (made possible by the pass laws), limited the extent to which the more affluent White municipalities would finance for the servicing of disadvantaged Black areas that remained undeveloped. Many of these “Black areas” are still underserved and, for many, some of the most basic services such as waste management are a luxury that they cannot enjoy.

After the first democratic election in 1994 and the final death of apartheid the African National Congress (ANC), introduced its socio-economic policy titled the Reconstruction and Development Programme (RDP). The programme was intended to address the socio-economic problems created by the apartheid state by alleviating poverty through the provision of basic services like housing, sanitation, water, waste management and electricity to the historically disadvantaged. RDP policies also aimed to create a stronger economy through the reduction of government debt, lower taxes, trade liberalisation, and infrastructure projects and contained fiscal spending to sustain the needs of a transforming and developing country.

It must be noted that apart from the racially based service delivery disparities, the above measures were necessary due to the fact that before the democratic dispensation in 1994, Apartheid South Africa’s economy was stagnant. According to Faulkner and Loewald (2008), on average, between 1970 and the early 1980s, investment in South Africa accounted for more than 25 per cent of Gross Domestic Product (GDP), reaching a peak of almost 30 per cent in 1976. From the mid-1980s through to 1993, progressively greater political uncertainty played a major role in investment decisions, and alongside very high inaction, contributed to economic stagnation and contraction. By 1993, the share of investment in GDP had dropped to below 15 per cent resulting in much lower growth rates and declining GDP per capita, while constraining future growth.

A radical transformation of the government was needed to provide accelerated service delivery to the historically disadvantaged African masses, whilst at the same time the new government had to revive the country’s ailing economy. A new legal framework

was formulated and enacted to guide the establishment of municipalities across the country and define their roles and responsibilities.

The Constitution of the Republic of South Africa, 1996 awarded powers to municipalities that enable and authorise them to execute their constitutional functions. Section 156 (1) of the Constitution, 1996 supra, delegates to the municipalities the authority to administer- (a) the local government matters in Part B of Schedule 4 and Part B of Schedule 5 of the Constitution, 1996 supra.

Section 152(1) of the Constitution of the Republic of South Africa provides the following objectives of local government to have effective delivery of services and to protect public interests:

- a) To provide democratic and accountable government for local communities;
- b) To ensure the provision of services to communities in a sustainable manner;
- c) To promote social and economic development;
- d) To promote a safe and healthy environment

The establishment of a robust legislative framework has empowered local government to deliver basic services like waste management. However it is evident that local government has been experiencing service delivery challenges that have resulted in the spiralling trend of service delivery protests. According to University of the Western Cape's (2015) Civic Protest Barometer on service delivery protest, such trends are worrying, specifically since "service delivery" protests more than doubled between 2007 and 2014.

The researchers also show that 2014 was the year with the highest number of these protests on record. The report states that between 2012 and 2014, Gauteng had more protests than any other province. Between 1 April and 10 May 2013 Gauteng was hit with an astonishing 560 protests according to the provincial police. Since 2007, Gauteng's share of protests had been rising more rapidly than any other province. Cape Town was the most protest-prone municipality, with 84 protests, followed by

Johannesburg, eThekweni, Tshwane and Ekurhuleni. These five municipalities accounted for half of all protests recorded in 2009. It is clear that this trend cannot continue and local government in particular the City of Tshwane as the capital of the country should look at solutions to address these service delivery related challenges with particular focus on waste management. The city should take the lead in developing mechanisms that will seek to address basic services like waste management and use such interventions to address these challenges in other municipal areas of the country.

Chapter 7 (Section 51) of the Local Government: Municipal Systems (Act.32 of 2000) outlines the basic values and principles required of municipalities. First, municipalities must remain responsive to the needs of the communities they serve. Second, municipalities should be accountable to the community and society as a whole by ensuring participation from the community and reporting back to the communities they serve. Third, municipalities must be performance oriented and set clear objectives in line with the Integrated Development Plan (IDP) of that given municipality; municipalities should also be flexible to enable them to confront and address environment and societal needs.

The involvement and participation of communities in the planning and implementation of service delivery programmes in their communities is a legislative obligation as provided under chapter 07 (Sec 51) of the Municipal Systems Act, (Act .32 of 2000). The high number of service delivery protest is an indication that local government is not fulfilling its legislative mandate of involving or responding to community service delivery needs. This research study will attempt to investigate and identify underlying sources to this situation and identify possible solutions that will ensure that local government and its communities have a better method of engaging and responding to their service delivery challenges. Such investigation will focus on the implementation of waste management services and policies in the City of Tshwane.

The researcher has chosen the City of Tshwane as a study region because of its strategic status as a capital city and administrative seat of government. The service

delivery focus area will be on waste management since waste management has become a global challenge across the world as a result of rapidly increasing population in cities because of urban migration. This development has often resulted in cities like the City of Tshwane experiencing increasing volumes of waste due to uncontrolled increases in population and economic activities.

This has resulted in a growing dissatisfaction on waste service delivery and has often resulted in multiple service delivery protests across the country on the eve of the elections, thus denying citizens to cast their votes. Therefore it is very important that government fulfils its constitutional mandate to deliver basic services like waste management to the public as part of its political and legal obligation (Wilkins 2001).

1.3 PURPOSE OF THE STUDY

This study examines the contours of service delivery inefficiencies with specific reference to waste management policies and procedures. It analyses service delivery policies, strategies and plans of the City of Tshwane. This is executed through in-depth analysis of the effectiveness of these documents towards service delivery. It seeks to identify current challenges of the unit of analysis, evaluate the service delivery programmes and identify those areas in the city where major waste management service delivery problems exist.

The findings and recommendation of the proposed study will contribute towards improving the implementation of waste management service delivery in the City of Tshwane. The study information will potentially provide critical data on what needs to be done to enable the waste management service delivery sector to make positive contributions to the development of the City of Tshwane.

1.4 THE STUDY REGION

The City of Tshwane was officially established in December 2000, an amalgamation of 13 former city and town councils. It is important to note that there has been strong debate and court challenges on the actual name of the city. In order to avoid confusion and maintain consistency when referring to the study region, the researcher refers to the study region as the City of Tshwane (CoT) or the city in this study. In 2007, the city approved a plan to implement a service delivery model based on 5 regions. However the number of these regions has since increased to seven (7) planning regions in the city (City of Tshwane Socio Economic Review, 2011).

The city occupied an area of 2199 sq. km (849 sq. Miles). With the incorporation of Metsweding District Municipality (Kungwini Local Municipality and Nokeng Local Municipality) in 2012, the area of the metropolitan municipality now stands at 6368 sq km (2459 sq. miles) making it the third largest world in terms of land area.

According to the Statistic South Africa's Census 2011 the total population in 2011 was 2. 918 000 million which translated to 3.1% population growth per annum for the period 2001 and 2011, that is, 911, 536 within the last 10 years.

Table 1: The racial makeup of the population as per the 2011 Census:

Race	Figures
Black African	2.2 million (75%)
Whites	586,000 (20%)
Coloureds	59,000 (2%)
Indians	54, 000 (1.8%)
Others	19,000 (0.6)

There are now 105 wards in the City with 210 ward councillors.

1.5. PROBLEM STATEMENT

Waste Management service delivery challenges have become prevalent in the City of Tshwane with communities engaging in service delivery protests to raise their unhappiness. Such protests take place after attempts by the community to voice their needs to the ward councillors or city officials without any positive response. Community members in the peri urban regions of the city often complain that they do not get quality and consistent waste services unlike communities in suburban or previously white areas or regions.

This has come to characterise the city as non-responsive and unconcerned about waste management service delivery challenges in the historically disadvantaged areas of the city. This perception has resulted in the spiralling number of service delivery protests across peri urban regions of the city. Waste Management Services are critical community needs which are supposed to be delivered efficiently and sustainably. Unfortunately, the lack of delivery of these services has propelled the increase in community protests.

Furthermore the city's waste disposal facilities are reaching their lifespan and with diminishing land availability it is going to be difficult if not impossible or expensive to establish new landfill sites. According to the CoT Integrated Waste Management Plan (2014), between 2013 and 2014 the city went from having 08 operational waste disposal facilities to 05 after closing 03 of its facilities due to them reaching their capacity. This reduction in landfill sites has resulted in the city not having any landfills in the south and west regions of the city.

The rapid influx of migrants is also increasing the burden of waste services for the city against nominal resources since most of the expanding areas of the city accommodate the poor people living in informal settlements. It is therefore critical that the city identifies alternative waste disposal methods because of the diminishing number of landfill site. Such interventions should also seek to meet the targets of the Polokwane Declaration.

The lack of consistent waste collection system across the city is resulting in increased number of illegal dumping sites and this poses serious health risk for the communities. An efficient and consistent quality system of waste collection should be developed to cater for all different regions of the city and eliminate the emergence of illegal dumping sites.

The current waste management methods of the city are not recognising the informal sector through the formalisation of reclaimers at various city landfill sites. This has resulted in the reclaimers working in unsafe and hazardous conditions. Lastly the city is still using outdated labour intensive waste collection methods which require high operational cost for the fleet, staff and equipment. It is critical that the city explores new advanced technological methods that can contribute to recycling of waste to energy.

It is against the above background that it is critical to analyse current strategies, policies and programmes of local government in the unit of analysis – which is the City of Tshwane in relation to their effectiveness against the current waste management service delivery challenges and also the future development of the city.

In view of the importance of the waste management service delivery sector in the development of South Africa, the monitoring of the service delivery achievements and failures needs to continue to occupy the attention of individual households, communities and organizations at informal public meetings and at official government indabas (Market Research Solutions. City of Tshwane Report: 2008). The present study will seek to provide descriptive and explanatory accounts of the waste management service delivery activities of the City of Tshwane, together with the contributions of those stakeholders associated with the activity system.

1.6. RESEARCH QUESTIONS

Due to the critical need for waste management service delivery particularly in previously neglected areas of the Tshwane area, this study considers this question: What extent are the challenges of implementing waste management service delivery by local government in South Africa with particular reference to the City of Tshwane?

1.7. OBJECTIVES OF THE STUDY

- To evaluate the waste management service delivery programmes and identify those areas in the city where major waste management service delivery problems exist.
- To identify case studies from other countries that can contribute to the waste management solutions of the city.
- To investigate the impact of the current waste management policy and strategy framework on the service delivery programmes in the city
- To investigate methods that will exploit the economic and poverty alleviation potential of the waste management sector.
- To examine and describe the activities of the stakeholders involved in the waste management service delivery implementation programmes of the city
- To identify the problems facing the waste management service delivery programmes and makes recommendations based on them.

1.8. CONTRIBUTION OF THE STUDY

The study will seek to make an academic contribution to the field of Public Administration with specific emphasis on local government waste management service delivery. The research will: (a) investigate causes to this phenomenon by investigating waste management service delivery policies, strategies and plans of the City of Tshwane; (b) conduct in depth analysis on the effectiveness of these documents towards waste service delivery; (c) seek to identify current challenges of

the unit of analysis; (d) evaluate the service delivery programmes and identify those areas in the city where major waste management service delivery problems exist; (e) investigate the impact of the waste management policies and plans on the service delivery programmes in the city; (f) examine and describe the activities of the stakeholders involved in the waste management service delivery implementation programmes of the city and (g) identify the problems facing the waste management service delivery programmes and identify recommendations based on them.

The study will make a contribution towards addressing the current waste management service delivery challenges through generating research knowledge that enriches the body of knowledge in the public administration sector. The knowledge generated will contribute towards showcasing the City of Tshwane as a capital City of excellence for South Africa and the challenge of local government in implementing waste management service delivery in the country. Such information can provide critical data on what needs to be done to enable the waste management sector to make positive contributions to the development of the City of Tshwane in particular and local government in general.

1.9. THE RATIONALE FOR THE STUDY

The City of Tshwane is the capital of South Africa and is the largest municipality, as measured by land mass and it is amongst the six largest metropolitan municipalities in South Africa and the second largest in Gauteng, as measured by Gross Domestic Product (GDP). The city has a vibrant and diverse economy, which enables it to contribute at least 26, 8% of the Gauteng Province's GDP and 9, 4% of the GDP of the national economy. (Stats SA 2011).

Tshwane is the administrative capital of South Africa and information from this study will therefore make a major contribution to the programme of showcasing the city as a city of excellence for South Africa. Such information can provide critical data on what needs to be done to enable the waste management service delivery sector to make positive contributions to the development of the City of Tshwane and South Africa in

general The city needs to present a positive image to the broader public and the condition of waste management services is certainly one issue that cannot be taken lightly.

The findings and recommendation of the proposed study will contribute towards improving the implementation of waste management services in the City of Tshwane. The study information can provide critical data on what needs to be done to enable the waste management sector to make positive contributions to the development of the City of Tshwane and other municipalities in South Africa.

1.10. LIMITATIONS

Limitations exist in the methodology, particularly the interviewing technique. First, the lack of anonymity may result in the reluctance of the interviewee to answer certain questions, which s/he believes if answered honestly may lead to negative repercussions. Second, the biography of the interviewer and other personal qualities may also influence responses. Last, interviewer bias may also occur due to the interviewer's perceptions or previous personal experience on issues related to the subject matter.

Still, interviews remain a superior technique for research because the researcher has the opportunity to probe even further the responses that are offered. This allows the researcher a deeper understanding of the issue at hand than would perhaps be achieved by a yes/no questionnaire. Interviews also allow for higher participation level on parties, namely the interviewer and interviewee. Shorter turnaround times are also possible when the interview method is deployed for research.

The study will be limited to the period 1994 to 2013, therefore the scope of the study will not cover periods before 1994. Access to complete City of Tshwane information is one limitation as some information though pertinent to the research might not be made available to the researcher on the grounds that its privileged information.

This study focuses only on the City of Tshwane and the use of the findings to generalise to other municipalities is limited. A study of this nature can be limited as well by the unwillingness of respondents to provide all the relevant information needed for this study. In terms of receiving the maximum support of the respondents for the study, the necessary arrangements were made timeously to give all stakeholders in the study sufficient time to understand the objectives of this study. This enabled them to feel that they formed an integral part of this project.

1.11. DELIMITATIONS

This study is limited to organizations, institutions and individuals who are linked to the field of waste management service delivery. This is a specialized arena of waste management and there is adequate literature to indicate how to conceptualize this sector. Efforts were made to clearly delimit this field conceptually within the City of Tshwane and there will be a demonstration of the benefits which this study can make to the residents of the city.

1.12. RESEARCH DESIGN, METHODOLOGY AND DATA COLLECTION

To ensure that the research was undertaken in a systematic process the following research design, methodology and data collection was implemented for the study.

1.12.1 Research Design

The research design is a plan or blueprint of how the researcher intends to conduct the research (Mouton, 2001). According to Bogdan and Biklen (2007) the research design, is the researcher's plan of how to proceed. The research design employed for this study was qualitative.

1.12.2 Qualitative research

The qualitative research approach is utilised in this descriptive study. Unlike quantitative research which uses control groups, numerical data and measurement,

qualitative studies do not result in conclusive rigorous facts about social phenomena but rather seek to explain the social change (Denzin, 2000). These factors provide answers to the research questions and solutions to the problem statement and also highlight data on the current situation (Denzin, 2000)

A qualitative research relies on the reasons behind and which govern various aspects of participants' behaviour (Babooa, 2008). Denzin (2000) describes qualitative research as a "situated activity that locates the observer in the world". Qualitative research uses four methods for collecting data, namely participation in the setting, direct observation, in-depth interviews and analysis of responses.

The qualitative research approach chosen by the researcher informed research questions of this study by making it possible to study waste management service delivery challenges at the City of Tshwane. The study involved the collection, analyses and interpretation of data by observing what participants do and say. The qualitative research approach was divided into the following two categories;

- The study of human beings and their behaviour by means of structured and semi structured interviews and direct observation.
- The study of products of human behaviour (Mouton, 2001)

The study of products of human behaviour includes implementation and outcome evaluation research as well as programme evaluation and policy analysis (Wessels, Pauw & Thani, and 2009). In this study the focus was on both categories.

1.13 RESEARCH SETTING

The researcher followed a qualitative research design which was based on the following sampling methods.

1.13.1 Population

Bless and Hidgson –Smith (2000) see a population as a set of elements that a researcher focuses on and from which the obtained results should be generalised. The study focused on the waste management service delivery challenges of the City of Tshwane. According to Neuman (2006), a population is the abstract idea of a large group of many cases from which a researcher draws a sample and to which results are generalised.

1.13.2 Sampling Method

Sampling refers to a small set of cases a researcher selects from a large pool and generalises the findings to the population (Neuman, 2006). The sample unit that is used in this study comprises of City of Tshwane officials. A total of fifteen (15) officials from the city were interviewed. This number was based on the equal representation of officials from the four study regions, 01, 02 05, 07 and the Waste Management head office. The sampled respondents are outlined below per region.

1.13.3 Purposive Sampling

The researcher used both purposive sampling and convenient sampling methods due to the fact that both methods are appropriate for my research and circumstances. De Vos (2005) states that purposive sampling uses the judgement of the researcher to select cases. This means that cases are selected with the specific purpose of getting the views from different stakeholders.

Purposive sampling was more relevant in consciously selecting officials from the City of Tshwane who are involved, competent and experienced in waste management service delivery matters.

1.13.4 Convenient Sampling

Convenience or opportunity sampling is the most common type of sampling in studies where the only criterion according to Dörnyei (2007) is the convenience of the researcher.

Due to limited funding for the research project, the researcher utilised this method of sampling because it is convenient for the researcher to meet with respondents considering the fact that units of observation will be in close proximity to the researcher's area of residence. Furthermore due to the fact that the researcher is a former employee of the city and has close relations with some of the respondents, it is therefore convenient for the researcher to meet with respondents even after hours or on weekends due to the relationship that the researcher has with some of the respondents and the fact that the researcher lives in close proximity to the respondents offices and residency.

Table 2: Management respondents per region

Region	Number of respondents
Region 1:	3
Region 2:	3
Region: 5:	3
Region:7	3
Head office	3

The sampling method is organized on the basis of the regions of the City of Tshwane. The current development plan has particular focus on the seven (7) planning regions in the city. Four (4) of these regions house the relatively poor households in the city where informal settlements exist and in which service delivery backlogs constitute a major challenge to the city. From the official development plans of the city, the areas falling under the four (4) planning regions are as follows:

Region 1

(North West): Mabopane station urban Core, Soshanguve Winterveldt, Theresa Park, Nina Park, Amandasig, Karen Park, Akasia metro core, Pretoria North CBD area, Rosslyn / Ga-Rankuwa, The orchards, Kopanong, klipkruisfontein, Hebron.

The region accommodates 27.78% of the residents of the city and it is the highest concentration of residents in all regions of the city. The region has high levels of unemployed, uneducated and poor residents. The region is bordering the city from neighbouring municipalities and provinces. This geographical location makes the region ideal for high influx of migrants from the Limpopo province seeking better economic opportunities (Tshwane General and Regions Report 2013).

Region 2:

(North); Wonderboom Airport, Babelegi Industrial Area, Wonderboom Nature reserve, Tswaing Crater Nature Reserve, Dinoken Nature Reserve, Hammanskraal, Temba, Montana, Annlin, Dooringpoort, Sinoville, Onderspoort, Stinkwater, Diloppe, Suurman, Mojaneng, Mashemong, Walmannsthat agricultural holdings.

The region covers 1062m² of land with a population of 339 182 residents in the northern part of the city. The region has many undeveloped pieces of land which has made it a target for regular illegal land occupations. So far the region has 49 informal settlements. Furthermore, this region like region 01 has high levels of unemployment, lack of education and poverty. (Tshwane General and Regions Report 2013).

Region 5

(Nokeng) Cullinan, Dinokeng Game reserve and Rodeplaat Dam.

This region was historically the Nokeng tsa Taemane local municipality which was incorporated into the city after the 2011 local government elections. The region accommodates 3.11% of the city's population and is the smallest region of the city. The region is primarily rural and its economy driven by tourism and mining. Many

residents in this region live in informal settlements. (Tshwane General and Regions Report 2013).

Region 7

(Kungwini) Brhonkorspruit, Ekadustria, Zithobeni, Ekangala/ Rethabiseng.

The region is in the eastern part of the city and is very rural with huge agricultural potential. The region experiences high influx of migrants from the Mpumalanga province. There are low levels of employment and limited economic opportunities. The economy of the region is largely agricultural. (Tshwane General and Regions Report 2013).

Information was collected and analysed from these 4 areas of the city through face-to-face interviews based on samples of the stakeholders associated with the service delivery sector. In addition, mailed questionnaires and observations were used where necessary to obtain the information needed for this study.

The following data collection methods were applied within the sampling methods under the following different topics.

- **The conditions of the services delivered.**

Under this topic, information was collected from government reports on the level of waste management service in the communities, employment situation, percentage of the households without the basic services, percentage of the population living in shacks, percentage of the population that access government services and other pro-poor facilities, number of service delivery protests since 2000.

- **The role of the government officials**

Information was collected from a sample of waste management directors in the city who are associated with the formulation of development plans on waste service delivery. The officials were asked to provide information on the nature

of the waste service delivery models, policies and strategies being used in the municipality. This include collaboration programmes and partnerships, outsourcing, privatization, and electronic service delivery among others.

- **Problems facing the service delivery programmes.**

The city officials like regional directors and waste management officials in the city were asked to provide information on what they perceive as the current problems facing the waste management service delivery programme, their perceptions about the programme, the problems and challenges which they see as facing the delivery of the services in the city and other related issues.

1.14. RESEARCH METHODOLOGY

Mouton (1996) describes methodology as the means or methods of doing something. The method of data collection used in the study included, interviews, observation and literature review and they are discussed briefly below.

1.14.1 Interviews

The researcher used structured and semi-structured interviews to collect data. Interview notes were recorded manually during each interview capturing the responses of the interviewees. All relevant City of Tshwane policy and strategy documents were considered. Analysis of implemented municipal waste projects and programmes was undertaken. The data collected from these programmes and projects was compared and integrated with the data collected from the interviews.

There are three types of interviews as identified and these are semi-structured, unstructured one-on-one and ethnographic interviews (De Vos 2005). The study utilised semi-structured interviews because the respondents as experts in the field and also operating in different regions with different dynamics required more flexibility. Bless (1995) maintains that semi-structured interviews encourage members of the project to describe their own experiences and allow for discovery of new aspects of

the problem by investigating in detail explanations given by the respondents. Interviews are open response questions of obtaining data from participants about how they conceive and give meaning to their world and how they explain events in their lives (McMillan and Schumacher, 1993)

The advantage related to interviews is that they enabled the researcher to receive responses and complete information immediately by probing and following up on important points raised by the respondents.

1.14.2 Observation

Observation method was also utilised to collect data for the study. The researcher selected one type of observation method which is non participatory observation due to the fact that the researcher wanted to avoid the risk of interviewer bias or getting involved in the research.

1.14.2.1 Non Participatory Observation

Walliman (2009) states that observation is a method of recording conditions, events and activities through non-inquisitorial involvement of the researcher. The researcher attended departmental management meetings in the waste management services division and observed, recorded verbal and non-verbal behaviour.

1.15 LITERATURE REVIEW

The last method used by the researcher to collect data was the literature review which entailed review of journals, books and reports like government reports regarding the waste management services. Case studies were drawn from waste management journals to support and augment the data collected on the subject matter.

1.16 DATA PRESENTATION

Kannae (2004) defines data entry as the process of creating a data file and keying in data. The raw collected data was reviewed and classified according to the sequence of data collected from the respondents. The classification was meant to distinguish between the differences in understanding and perception between one interviewee to the other.

1.16.1 Data Analysis

The data was manually recorded during the face to face interviews and no recording machine was utilised by the researcher. The researcher analysed and interpreted the collected data.

1.16.2 Document Analysis

Beyond the data generated from interviews secondary data from other sources like reports and policies for the purposes of addressing a research problem was used in this regard. (Babbie et al, 2001).

The techniques for analysing documents that are used in this study are:

- The literature review of published and unpublished material
- Interviews
- Examination of relevant legislative and policy documents

1.17 DEFINITION OF KEY CONCEPTS

The definition of key concepts such as public policies, service delivery, legislation, and budget, municipal planning, service delivery protests and South African public service is elaborated in more detail below.

1.17.1 Public Policies

Moran, Rein and Goodin (2006) view public policy as the business end of political science, where theory meets practice in the pursuit of the public good'. Public policy is defined broadly as all formal and publicly known decisions of governments that come about through pre-determined channels in a particular administration.

Parsons (1995) argues that public policy-making takes place in the context of the constraints of economic, social, geographical, historical, and cultural and globalisation limits, and that public policy-makers engage in judgements as to what these realities are. In this study public policy is defined as instructive documents/decisions that government develops and implements to enhance its economic, social, geographic, global and infrastructure. A good example of such policies include the RDP, the Growth, Employment and Redistribution (GEAR) programme and the Accelerated Shared Growth Initiative for South Africa (ASGISA).

1.17.2 Service delivery

Fox and Meyer (1995) define service delivery as the provision of public activities, benefits, or satisfactions to citizen. This study defines service delivery as the provision of a service or product by the local government or municipality to the citizens as expected by the citizens and mandated by the Acts of Parliament. For the purpose of this study I used this definition since it covers the needs and satisfaction of residents or customers in relation to their service delivery needs.

1.17.3 Legislation

According to The Shorter Oxford Dictionary on Historical Principles (1964, s.v. "legislation") the term legislation refers to the "action of making or giving laws, or the enactment of laws". It consists mainly of laws (also called statutes, acts or regulations) made by the national parliament and other bodies such as provincial legislatures. This

study defines legislation as the regulatory framework that government has to comply with in meeting the service delivery expectations of its citizens.

1.17.4 Budget

Blumentritt (2006) defines budgeting as “the process of allocating an organization's financial resources to its units, activities and investments”, while Horngren et al, (2004) see budgeting as the quantitative expression of a proposed plan of action by management for a specified period and an aid to coordinating what needs to be done to implement that plan.

1.17.5 Service Delivery Protests

Service delivery protests are organised marches, mass meetings and public demonstrations that are organised to raise community complaints about lack of service delivery. These service delivery protests are mostly led by community members who head some interest group or political party. Non-violent protest is not necessarily a rejection of authority (Wilkinson, 1988). During these protests, protesters prepare a document stating their demands and stating when their demands must be met or responded to.

1.17.6 The South African Public Service

These are a group of public institutions operating under the auspices of the South African Public Service Administration, mandated by the Public Administration Act. Section 8 of the Public Service act (proclamation 103 of 19194) states that the South African Public Service constitutes all persons holding fixed positions or permanent additional appointments in the service. The South African Public Service operates from an environment different from that of the private organizations. Fox, Schwella and Wissinki (1991) identify the differences between the two as follows:

- Public institutions are exposed to greater public scrutiny as well as unique public expectations.
- The environment of public institutions is more legal, formal and has more judicial restraints than private sector organizations.

1.17.7 Municipal Planning

This is a function assigned to municipalities in terms of section 156 of the Constitution of the Republic of South Africa read with Part B of Schedule 4 and in terms of which municipalities have both executive authority and a right to administer to the extent set out in Section 155.

1.18 ETHICAL GUIDELINES

According to Bailey (1994) to be ethical is to conform to accepted professional practices. It is generally agreed that it is unethical for researchers to harm anyone in the course of research. There are reasons why ethics in research are applied in this study. First, to ensure people and institutions that participate in the research are not harmed in any way. Second, to make sure that the research is being conducted to the highest quality (Graziano and Raulin, 1993; Babbi and Mouton, 2003). This research followed strict ethical guidelines. Ethical clearance was requested and granted by the University of South Africa's Ethics Committee. Participants of the study were requested to fill out consent forms and all identifying information was kept confidential

1.19 OUTLINE OF CHAPTERS OF THE STUDY

Chapter 1: Introduction and Background

This chapter provides a general introduction to the study and includes the background, rationale, motivation, problem statement, research questions and aims.

Chapter 2: Literature Review of Waste Management Globally

This chapter reviews waste management service delivery implementation and literature globally in countries like Sweden, USA, Ireland, Ghana, Brazil, Botswana and India.

Chapter 3: Implementing Waste Management in the City of Tshwane

This chapter reviews the implementation of waste services in the City of Tshwane with particular focus on the city's historically disadvantaged regions.

Chapter 4: Research Design and Methodology

The chapter explains the research design and methodology that was used for the research.

Chapter 5: Presentation and interpretation/discussion of findings

In this chapter there is a comparison and analysis of the collected data and expected findings of the research.

Chapter 6: Recommendations and Conclusions.

The chapter offers recommendations based on findings and makes some conclusive remarks.

1.20 CONCLUSION

A study on the challenges of implementing waste management policy in a city is critical to satisfy the needs and expectations of the public. This challenge can be addressed by evaluating current waste management service delivery policies, strategies and plans of the city to determine their effectiveness, problems and limitations. This study not only makes an academic contribution to the field of public administration and management, but provides public officials and politicians with practical solutions to

improve the effectiveness of their waste management service delivery programmes, policies and plans.

Waste Management has become a global challenge and in the next chapter the researcher will conduct a literature review on the global waste management phenomenon.

CHAPTER 2: LITERATURE REVIEW OF WASTE MANAGEMENT GLOBALLY

2.1 INTRODUCTION

The evolution of mankind shows processes of civilisation and urbanisation which created urban communities. The urbanisation of society brought with it the generation of waste in different forms i.e. solid, medical, electronic and organic waste. The integration of societies and creation of a global village has connected different countries and citizens together on issues of politics, trade and economic development. Such integration has also contributed to high migration levels between poor and rich countries. South Africa as an economic hub of the African continent is facing such a phenomena with the influx of migrants from other neighbouring African countries. There is also the high influx of internal migrants particularly to the metropolitan areas of the country and this has led to the emergence of informal settlements.

This is the case in other countries like the USA, UK, and France that face serious challenges with influx of migrants from other countries and the socio economic catastrophe associated with this phenomena.

The driving force behind the influx of migrants is the hope for better opportunities in countries with positive and stable economies. This results in urban areas of such countries being over populated due to local urban migration and external migration. This situation is well documented in the City of Tshwane with foreign nationals and local migrants from other provinces. As a result of rapid urbanisation it is becoming difficult for cities to provide the necessary services due to the fact that the rate of urbanisation and population associated with it far exceeds the rate in which resources are allocated to service delivery departments. It is for this reason that waste management services have become a global crises that is threatening to explode into a catastrophe.

This chapter examines the challenges and opportunities of implementing waste management policies across local government municipalities in other countries. The

importance of such a process lies in the opportunities given for identifying more appropriate models for tackling the challenges confronting society. According to Roodt (2001), learning from other regions has the potential of providing lessons in best practice on how to mobilize communities to effectively implement development programmes and projects.

It is therefore important that this study seeks to draw positive lessons from other countries on how to resolve the waste management challenges of the city. The methods applied in drawing policies and plans that will seek to remedy the waste challenges will facilitate a positive contribution to the lives of the communities (Fiehn and Ball, 2005; Muzenda, Belard, Mollegee and Motampane, 2005; and Muzenda, Ntuli and Pilusa, 2012).

The reality is that waste generation originates from a growing population, growing economy and price increases (Dasgupta 2010). Therefore on the same note, Lilja (2009) emphasises that waste prevention should be part of growth and development, and needs to be managed to conserve the use of natural resource. Godfrey (2008) argues that community involvement in the development and implementation of policies and plans to manage waste management is critical.

Increasing population levels, booming economies, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries (Minghua et al., 2009). This situation has created challenges for metropolitan municipalities like the City of Tshwane and it is critical that the municipality adequately responds to this phenomena.

This study is exploratory in the sense that it provides information as to how things are happening out there to address the waste management problems. The study is also evaluative in the sense of evaluating the extent to which the objectives and targets set in the current waste management policies of the cities have been achieved. In addressing the waste management problem from these perspectives, the theme or emphasis will be on the implementation processes, that is how the various

stakeholders are interpreting their assigned roles and responsibilities. The meaning which stakeholders put on their assigned roles is one key indicator of the successes and failures of public development projects and this study seeks to pay particular attention to this element of programme evaluation (Mouton, 2001).

2.2 DEFINITION OF WASTE MANAGEMENT

From the literature, it is clear that waste management is a set of activities that include the following according to Fiehn and Ball (2005):

- a. collection, transport, treatment and disposal of waste;
- b. control, monitoring and regulation of the production, collection, transport, treatment and disposal of waste; and
- c. Prevention of waste production through in-process modification, reuse and recycling.

According to Schübeler (1996) waste management is defined as any activity that aims at minimizing the impacts of municipal solid waste on public health and the environment including characterization and measurement, collection and transportation, separation and resource recovery, processing as well as disposal. The Waste Environmental Management Waste Act of 2008 defines waste as any substance, whether or not that substance can be reduced, re-used, recycled and recovered that:

- (a) is surplus, unwanted, rejected, discarded, abandoned or disposed of;
- (b) is of no further use to the generator for the purposes of production;
- (c) must be treated or disposed of; or
- (d) is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but— (i) a by-product is not considered waste; and (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste;

The Organisation of Economic Cooperation and Development (OECD) defines waste as: “materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose”. (OECD, 2003). The Basel convention defined waste as: (UNEP, 2004) “Substances or objects which are disposed or are intended to be disposed or are required to be disposed of by the provisions of national laws. It is clear that whilst there can be different definitions of waste, such differences ultimately reflecting the meanings assigned to it by the organization concerned (Muzenda, Ntuli and Pilusa, 2012). Therefore for the purposes of this research all definitions are applicable and appropriate for this study since these definitions consistently reflect the meanings assigned by the different organisations.

2.3 REVIEW OF WASTE MANAGEMENT GLOBALLY

Waste Management has become a universal challenge for all countries and it is always critical to study strategies, methods, policies and technology that has been applied by other countries in addressing and managing their waste challenges. Due to the uniqueness of each country it is not always that solutions will be the same, but lessons can be shared and solutions designed for a country based on its socio- economic strength and opportunities.

This chapter engages in a review of waste management globally with a focus on countries such as Sweden, Ireland, United States, Ghana, India, Botswana and Brazil. It is envisaged that best practices and lessons will be drawn from the waste management models from these countries with a view to making recommendations to address the local waste management challenges in the city in particular and South Africa in general. These recommendations are potentially applicable to other developing countries.

2.4 COMPARISON OF WASTE MANAGEMENT BETWEEN COUNTRIES

The issue of poor waste management is a challenge throughout the world, in both developed and developing countries. People always generate solid waste through their daily activities. Solid waste needs to be managed in a manner that minimises risk to the environment and human health. This requires appropriate storage, collection and proper disposal. At the same time solid waste creates livelihoods for the urban poor in terms of employment and business.

The mass of waste produced in the world has been growing considerably for many decades especially in affluent countries as shown by the link between national gross domestic product (GDP) and waste generation per capita (World Bank, 1992; OECD, 2003). This simply means that municipal waste management is a global challenge that will require multiple alternative solutions from across different countries.

This study engages in a theoretical review of waste management with reference to Brazil, India, Ireland, Ghana, Sweden, Botswana and United States in order to identify challenges and possible waste management intervention or best practices from these countries.

2.4.1. IRELAND

Ireland is a country in Europe with a population of 4 million people, but whose economy has been growing faster than elsewhere in the European Union (EU). Since early 1990 the country transformed its waste management methods to address its then growing waste management (Rudden 2005). The country's waste policy was based on the European Union (EU) environmental policy. The objectives of this policy was to use waste minimisation efforts to reduce waste and exploit the economic potential of waste.

Historically, before 1996 the waste management model of the country relied on landfilling with 95% of the country's waste being landfilled in poorly operated dumps. The current waste management situation in Ireland is different from the early 1990's

as a result of transformed waste management practices which moved waste management from landfilling to more innovative recycling measures and high investment on recycling infrastructure. According to the Waste Database Report, (2003) national municipal (household and commercial) recycling rate in 2003 was 28% and is now, certainly, in excess of 30% which is double the equivalent recycling rate in the UK. The remaining 70% of municipal waste in Ireland is currently landfilled. Between 2010 and 2016 Ireland has managed to have only 30% of its waste landfilled and this largely consisted of residuals from biodegradable waste. During the same period Ireland moved from having twenty five (25) operating landfill sites to seven (07) in 2016 due to the country's waste minimisation efforts. The high landfilling levy that was introduced by the government as part of its waste minimisation strategy is attributed to be one of the critical interventions that has contributed to this positive milestone (IEPA Municipal Waste statistics 2013-2016) This process demonstrates how legislation, enforcement and awareness can be used to positively change societal behaviour towards clean communities and efficient waste minimisation systems.

Ireland has gradually managed to move improve its waste management status from a very poor baseline to one of Europe's integrated systems that has largely reduced its landfilled focused waste process. The dramatic reduction of landfill sites is a pure demonstration of such positive progress. This remarkable achievement brought all stakeholders together from the private and public sector to partner in addressing the country's waste challenges. The outcomes of this process has benefited all parties and continue to profile Ireland as one of the waste management success story in Europe.

It is also critical to emphasise that at national level, there has been strong political will to inspire change and to invest in the advice of professional waste management planners, engineers and environmental scientists. The new integrated waste system planned for Ireland - and now being implemented - has been evaluated as the Best Practicable Environmental Option (BPEO) leading to environmental improvements and an affordable waste management system in the future (IEPA Municipal Waste statistics 2013-2016).

One of the contributing factors to the positive Ireland story is the discovery and appreciation that waste management is really about people. The projects in Ireland that have invested in having people as part of the solution have been successful. Waste management initiatives purely involving machines and technology do not succeed unless there is adequate stakeholder involvement and any use of technology needs to be part of an integrated solution together with prevention and recycling policies.

It is evident that a people centred approach to waste management is a potential solution to the City of Tshwane considering Ireland's experiences. The City of Tshwane as an authority is empowered by law to exercise such authority for the general wellbeing of its communities. It is therefore important that the city takes key role with regards to implementing and enforcing its by-laws to foster positive behavioural changes towards waste minimisation and recycling by the communities. This can be achieved through a strong enforcement of by-law policies supported by consistent community participation and involvement.

2.4.2 SWEDEN

Sweden has a very good reason to be proud of its waste management achievements since landfilling is no longer a primary method of waste disposal. Instead, an increasing proportion of waste is used to recover energy and material and enables re-use. (Sweden Waste Plan 2020).

The Swedish waste model is similar to that of South Africa whereby national government through legislation delegates the responsibility of managing solid waste to municipalities. Once again like South African municipalities, the Swedish municipalities contract private waste companies to collect household waste with some collection of waste done internally by the municipality (Sverige, 2010).

Over the years Sweden invested in incineration infrastructure as its landfilling alternative and developed legislation in this regard. However, the risk of dioxin

omissions forced the Swedish government to identify alternative waste disposal methods. During the 1990s the Swedish government adopted a waste management strategy that was aimed at restricting waste volumes, increasing recycling, reuse and improving. This was a critical milestone in the Sweden's waste transformation interventions. To enforce this strategy, the government introduced punitive measures for polluters through a waste scheme that provides targets for collection and disposal of their goods packages, electronic and electric equipment etc. In order to fulfil their legal obligations producers and importers created material companies that work under a national monopoly on the collection and recycling of the specific waste categories. (Swedish EPA, 2010).

In order to mitigate potential or residual landfill methane emissions and possible climate change implications, Sweden introduced a tax on waste taken to a landfill and banned the landfilling of combustible material in 2002 and of organic waste in 2005. Between 2006 and 2010, the country introduced a tax on incineration of household waste to encourage the recycling of fossil fuel based products. (Swedish EPA, 2010). This aggressive legislative intervention demonstrated the strong political will of the Swedish government to efficiently deal with its waste management challenges. The outcomes of this intervention has been a strong recycling culture that has had a positive impact on the waste minimisation efforts of the country.

The national government of Sweden has revised its policy of entrusting the waste function to municipalities and facilitated the creation of a waste market. (Skottheim & Paz, 2004). This market is determined by the nature and origin of the waste which ultimately determines who is responsible to handle the waste (Svensk Författningsamling Stockholm (SFS), 1998).

The municipal monopoly on the treatment of industrial waste was terminated in 2000, and the treatment of dangerous waste was deregulated and opened to private actors in 2007. Today, the municipal responsibility for waste management is limited to the collection and management of the part of household waste that is not the subject of producer responsibility obligations.

Whilst this model has proven to be successful in Sweden , the researcher would argue that it would not be a positive model for the City of Tshwane due to the socio economic challenges of the communities within the study regions in particular and municipal geographical area in general. Privatising such a basic and necessary service might be too costly for the poor and thus have the consequence of poor areas not being serviced or not being in a position to afford the service. This privatised model of waste service delivery model can be tested on commercial businesses in order for the city to focus on households.

The current waste management method in Sweden is that a quarter of total household waste is collected by the municipalities themselves and three quarters are collected by contracted private companies (Sverige, 2010). As an outcome of forty years of legislative efforts, only 3% of municipal solid waste is landfilled today in Sweden. The rest is incinerated (49%), recycled (35%), or composted (13%) (Eurostat 2011).

It is encouraging to note that 50% of waste generated in Sweden is recycled whilst the other 50% is used for generating power through the waste to energy (WTE) incineration system. This demonstrates how waste can be converted into a valuable commodity.

This process has resulted in power from the incinerators used to heat up homes and provides electricity to households across the nation. To be precise, Sweden uses waste for heating 810,000 homes and provides electricity for 250,000 homes. Waste constitutes 20 percent of the fuel used by the network of district heating plants in the country.

Sweden gets paid by countries like Norway and Britain to import their garbage. In 2014, Sweden imported around 800,000 tons of garbage to feed its energy-producing incinerators. Data suggests that by 2020, Sweden will be importing 2.3 million tons of garbage (Eurostat 2011).

Sweden has been able to achieve this staggering success in waste recycling even as waste generated across the nation continues to grow. For example, heavy metal emissions in Sweden today are 99 percent lower than what they were in 1985, while waste generation has increased three-fold since then. The country's 9.5 million residents play an active role in the process. Recyclable waste is segregated at home before disposal. Organic waste cannot be diverted to landfills. Households are supposed to take metal, glass, plastic, paper and such materials to local recycling stations. Stockholm, in fact, has a system of tubes that connect trashcans to recycling centres.

Through its legislative interventions, Sweden has managed to influence a culture of recycling and implemented innovative means of using waste as an energy source. This has resulted in the country minimising its waste to landfill and at the same time creating economic opportunities through its waste material.

The country has managed to achieve an important milestone in its waste minimisation efforts through the reduction of its operational landfill sites from twenty five in 2010 to seven (07) in 2016. Due to the current landfill and poverty challenges faced by developing countries like Ghana, Rwanda and South Africa, recycling of waste is one of the key interventions that can contribute towards addressing the socio economic challenges faced by the City of Tshwane.

2.4.3 San Francisco, United States of America

San Francisco is a city which is small for a major metropolitan area with only 127 km² houses and 805,235 residents. The population is highly diverse, and 1 in 2 residents do not speak English at home. About half of residents live in small multi-family dwellings, with a third owning their homes. (Gokaldas 2010).

As San Francisco does not have its own landfill. Waste is transported 85 km away for disposal and this cost is factored into municipal rates to encourage recycling and composting, this reducing the need to dispose at the landfill. In this way, the waste diversion strategy of “pay as you throw” encourages recycling and composting by

charging no additional cost on residential customers for collecting recyclables and organic waste and a 75 percent discount for commercial customers. An average resident of San Francisco generates 1.7 kg of waste per day and 72 percent of this waste is recycled. The city has been able to achieve much in the area of waste minimisation and this is supported by an enabling legislative framework, even at national level, that encourages recycling, the use of “green” compostable products and puts a ban on products such as plastic bags.

The city has managed to promote public awareness and community involvement by hosting community clean-up programmes that involve Public Works staff, working with business owners and residents, to encourage best practices by means of events such as street fairs. As a result of such outreach programmes, San Francisco disposes only 28 percent of its waste to landfills. As much as 72 percent of waste is diverted from landfills by reuse, recycling or composting for agricultural use (UNHABITAT, 2010).

The experiences of San Francisco also indicate the importance of creating an enabling environment via the enactment of ordinances and regulations that instil the desired behavioural change. Community involvement has also been a key factor in minimising the waste disposed in landfills.

Once again, it is evident that in order for the City of Tshwane to advance proper waste management interventions such measures should involve using the municipality’s weaknesses as potential solutions to its waste challenges. The San Francisco case studies demonstrated how the city used its lack of landfill site and the high cost of transporting waste 85 kilometres away as a means to levy high waste service costs that encouraged the residents to embark on waste minimisation processes and increased recycling which contributed to the high percentage of waste recycling (72%) and low landfilling (28%).

Lastly, the establishment of a private employee owned waste management company, called Recology, that charges each household for waste services depoliticised the waste management services and removed such a service from the bureaucratic

processes of local government that are largely influenced by political dynamics and circumstances. This is an example of how the City of Tshwane can aggressively pursue the establishment of a municipal waste management entity that will be run from a company model in order to sustain its service delivery expenses through efficiencies and quality waste service. The entity will be run by an independent board that will report to the city. It is important to note that whilst this model is recommended such a model is also not immune to political interference or bureaucratic influences as recently demonstrated by strikes by Pick It Up staff from the City of Joburg during April – June 2016.

2.4.4 INDIA

As one of the countries with a fast growing economy, India is facing rapid urbanisation as a result of influx of migrants from its villages to its cities. This growth has contributed to a population explosion in cities which results in high volumes of waste generated by the communities. (Bundle et al., 2010; Gidde et al., 2008; and Sharholy et al., 2007).

The lack of sufficient waste management infrastructure and facilities compound the waste challenges in India against a growing population. As a result of this situation the scientific disposal of waste will have adverse impact on the environment and hence it is critical that waste minimisation efforts are explored and implemented (Gupta et al., 2007; Rathi, 2006; Ray et al., 2005; Sharholy et al., 2005; Jha et al., 2003)

The high population in Indian cities and material consumption of such growing populations generate huge volumes of waste which must be collected and disposed to avoid the possibility of posing an environmental health hazard. (Saxena et al., 2010 and Zhu et al., 2008). The disposal of this waste is one of the major challenges due to lack of adequate landfills. The economic growth of the country which contributes to urbanisation and high standards of living have a huge influence on the quantity of waste generated. (Gidde et al., 2008; Rathi, 2007). A significant number of different waste categories in India are categorised together as urban waste (Syed, 2006). This means that there is no clear plan and strategy to separate waste for recycling or reuse

purpose. Such a process is not sustainable and thus India will be facing a landfill crises in the near future.

India accommodates the second largest urban population among the countries of the world, although the country is one of the least urbanised. Its metropolitan cities account for 42% of its population (Ghosh and Kansal, 2014). These cities are the highest generators of waste in the country and lack of financial, institutional resources and capacity has increased the waste management challenges (Parthan and Milke, 2009). A proper short, medium and long term waste management planning is one of the key interventions that can assist India as proven in other countries like Sweden and Ireland. (Hanrahan et al., 2006).

The planning process should include human resources capacity to ensure proper management of waste management services. A number of researchers have reported lack of management of waste by municipalities due to lack of capacity (Mohanty et al., 2014; Das and Bhattacharya, 2013; Noorjahan et al., 2012; Jafari et al., 2010; Chatterjee, 2010; Imam et al., 2008; Chung and Carlos, 2008; Berkun et al., 2005). This has resulted in waste management systems and processes collapsing in most municipalities. The City of Tshwane should guard against this possibility considering that its current waste challenges can escalate into irreparable catastrophes. Lack of proper waste management interventions will result in the city becoming one of the main pollution sources as has been the case in the Indian cities (Shazwin and Nakagoshi 2010).

India's continuous disposal of municipal waste is accelerating due to poverty, lack of capacity, poor governance, growing population, low level of environmental awareness and insufficient environmental knowledge (Rachel et al., 2009; Ogu, 2000). The diverse profile of communities influence the quantity and type of waste generated based on income levels, culture, social behaviour, climate and production. This is also relevant to the City of Tshwane, due to its heterogeneous regions and different classes of communities (Late and Mule, 2013; Yadav and Devi, 2009). It is for this reason that the researcher argues that it is a reality that communities exist in a class society and

as such a different, quality, low cost and consistent waste model is developed for the poor instead of rolling out the same model for all regions which might end up being unaffordable and thus promote illegal dumping for residents who cannot afford the service.

The quantity and characteristics of solid waste vary from place to place. Factors that influence the quantity and composition are the average income level, the sources, the population, social behaviour, climate, industrial production and the market for waste materials (Late and Mule, 2013; Yadav and Devi, 2009). The present annual quantity of solid waste generated in Indian cities has increased from 6 million tons in 1947 to 48 million tons in 1997 and to 90 million tons in 2009 and it is expected to increase to 300 million (Sharholy et al., 2006).

Waste collection in India remains largely unorganized. There are significant deficiencies in waste storage at source. The collection bins used in various cities are neither properly designed nor properly located and maintained. This has resulted in poor collection efficiency. The average collection efficiency for waste in Indian cities and states is about 70% (Saxena et al., 2010; Rathi, 2006; Siddiqui et al., 2006; Gupta et al., 1998; Maudgal, 1995; Khan, 1994).

It is quite clear that lack of waste management systems, resources and capacity is paramount to a well-functioning waste management system. The lack of technical expertise has become a chronic waste challenge for developing countries like India and South Africa. (Kausal et al., 2012). Specialised and technical interventions are required to address the current waste challenges in developing countries. The only technical innovations introduced in India's waste management systems is the aerobic composting and vermi-composting and waste-to-energy (WTE) incineration, palletisation and biomethanation. (Kausal et al., 2012). However, due to the lack of financial viable sources of funding and capacity these innovations have not been fully implemented and operationalised. This is a typical example of lack of political will to aggressively introduce alternative waste management methods.

Only 6%–7% of the municipal waste is converted into compost in India (Annepu, 2012). The rest of municipal waste is disposed of through landfilling. (Annepu, 2012). It is therefore evident that the lack of capacity and waste management systems are the major underlying source to the waste management challenges in India. This situation can be correlated to the challenges faced by the City of Tshwane. A weak and unorganised waste system cannot deliver a consistent and efficient service to an increasing urban and peri urban population with limited resources and capacity. Another fundamental flaw in the waste management system of India is the lack of community involvement and awareness. The current socio economic challenges in India should necessitate the involvement of the communities in waste management and create economic opportunities for such communities.

2.4.5 GHANA

The Republic of Ghana has a population of 28,000 000 and covers an area of approximately 238 535 km². The country's capital city, Accra, is home to 18% of the country's total population and 30% of the country's urban population. Accra serves as the economic and administrative centre of the country which has made the city an important destination for Ghanaians from all parts of the country seeking better economic opportunities (Thompson 2010).

It is critical to mention that 80% of the city's population is poor and 17% is middle class and 3% lives in high income and low density residential areas of the city. As a capital city, Accra has over the years experienced annual growth rates of 4% and making it one of the fastest growing metropolis in Africa. Such growth has resulted in the high urban migration of residents from neighbouring areas and the rapid growth of waste production that exceed the capacity of the city for containment and processing.

The city of Accra generates nearly 900 000 metric tons of solid waste per year from which about 67% is organic waste. The rate of waste generation is approximately 0.5 kilograms per person per day. Accra accounts for 30% of the national waste generated

in Ghana and this is a very high rate that requires urgent attention (Samwine et al 2017).

Since its independence in 1957 Ghana has never had a proper function waste management system. Landfilling is the current method of disposing waste and due to lack of adequate landfill sites and proper management of these sites the country is experiencing a waste management crises. The high influx of people from rural parts of Ghana into Accra has worsened the waste management challenges. Furthermore, the class divide is another factor that also manifest itself into the different types of waste services provided to the different class groups and areas of the city.

This class based service delivery model is a demonstration of how privatisation of basic services like waste can have a negative impact on poor communities. Affluent communities receive consistent and quality waste services whilst poor communities who receive free waste service from the municipality get sub-standard and inconsistent services.

Furthermore, privatisation of waste management services has proven to be a corrupt partnership between private companies who stand to make huge profits and corrupt politicians who have strong political influence and benefit from getting these private waste companies to become a waste management monopoly. This has resulted in the poor areas of Accra being dumpsites and posing a huge environmental health risk to the broader community.

There is a perception that this phenomenon is becoming evident also in the delivery of services to the City of Tshwane's poor areas like informal settlement and townships particularly in region 01, 02, 05 and 07. In order for the City of Tshwane to avoid the waste management challenges experienced by the city of Accra, it is important for the city to ensure that its waste management model is not commercialised but segregated to have a quality and efficient model for poor communities. This means that the City of Tshwane can look at having waste skips at strategic points of the informal settlement to collect waste from a communal point. Furthermore, the city can use waste

minimisation efforts in poor communities as an alternative to job creation and economic development opportunities. Already at the Heartherly Landfill site in Mamelodi a lot of community members from the nearby Mandela informal Settlement operate as reclaimers at the landfill to exploit economic opportunities derived from waste materials.

The City of Accra is currently using the collection and disposing at landfills waste management method and approach. The city's landfill in Tema is 37 kilometres outside the city. Whilst this can be positive in terms of ensuring that the city is not exposed to hazardous elements at the landfill, it is a costly transport exercise for the city and with diminishing landfills and nominal implementation of waste minimisation efforts Ghana is facing a waste management crises.

However, despite these waste management challenges, the Waste Management Sector has grown so big in Ghana that private companies like Zoom Lion have exploited the economic opportunities created by the waste management. The company currently employs 65 000 citizens and improves their livelihoods. Lastly, 63% of the city of Accra's waste is organic. Such waste from urban, peri-urban and industries is a resource since it can degrade and release methane for energy generation (Samwine et al 2017).

Therefore with similar characteristics like Accra, the City of Tshwane can learn from the waste management challenges of the former in relation to privatisation of the waste service, political interference, and lack of capacity, technological innovation and proper planning. Furthermore, it is important to recognise the opportunities that can be exploited from a waste management crises similar to that of Ghana with the emergence of a formal and informal waste economy that accounts for over 65 000 job opportunities. The creation of recycling plants and waste to energy infrastructure a plan that the City of Tshwane can implement as part of its waste minimisation efforts.

2.4.6 BRAZIL

Brazil has a population of 190 000 000 people and such a high population is bound to have waste management challenges relating to the production of waste exceeding the capacity of the waste management services. Abrelpe (2010) reports that the country generated 57 000 000 tons of municipal waste in 2009, which is an increase of 7.7% compared to 2008. According to a World Bank study (2010), the data from Abrelpe is more reliable as these are based on surveys and studies undertaken by both the Ministry of Cities and the Ministry of Environment. The waste generated in Brazil consists largely of organic material. Other materials that constitute a significant share in waste are plastics, paper and cardboard. Various studies show figures for the overall composition of waste in Brazil (Bianchini and Filho, 2006; Monteiro et al., 2008).

The collected rate of municipal waste in Brazil is estimated to be 89% and this is an indication of an increase on coverage compared to 2008 and 2009. However, 57.6% of the waste is disposed in sanitary landfills whilst the remaining 42.4% is disposed in uncontrolled landfills, 24.3% in controlled landfills and 18.1% on dumps. (Abrelpe 2010).

It is shocking to note that the majority (60%) of Brazilian municipalities do not dispose their waste properly and thus contravene waste policies and by-laws. This is a result of lack of recycling initiatives that lead to waste minimisation. The recycling rate of Brazil is very low at 4-11% (Abrelpe, 2010).

According to Abrelpe (2010), the waste management sector generated almost 300,000 direct jobs in 2010, 57% of which was created in the private sector and 43% in the public sector. However, a large informal sector that collects materials from waste for recycling exists in Brazil. The National Movement of Recyclable Materials Waste Pickers (MNCR) estimated that more than 500,000 people in Brazil collect and market solid waste in large cities for their survival (Fergutz et al., 2011). Only a small percentage of these waste pickers (5% according to Fergutz et al., 2011) have a contract and work under relatively good conditions.

Furthermore, it is estimated that waste pickers provide +/- 90% of the materials that supply the recycling industry and account for less than 10% of recyclable material generated in households and 3% of solid waste deposited in dumps. It must be noted that the work of these pickers contributes to cleaner cities and a healthy environment. Estimates demonstrate that this also reduces the amount of waste deposited to landfills by 20% (Fergutz et al., 2011).

The status of these waste pickers is still considered illegal by the authorities and this perpetuates the harassment of these pickers by waste authorities. Another issue is the lack of protective equipment which exposes them to hazardous and toxic environments. An absence of a recycling culture and the presence of the large informal sector inhibit the growth in recycling of municipal solid waste (Bianchini and Filho, 2006).

According to a study by Abrelpe (2010), the urban generation of waste in Brazil totalled 61 Mt in 2010. Although the waste generated in rural areas is not included in this figure, it is assumed that focusing on urban waste only will cover the majority of waste generated in the country, since about 83% of the Brazilian population currently lives in urban areas and generally less waste is generated in rural areas due to different eating and buying habits (World Bank, 2012; Abrelpe, 2010).

The Brazilian waste legislative framework is integrated with the National Waste Plan that set waste targets for the country. The framework consists of the waste hierarchy: reduction, reuse, recycling, energy recovery and final disposal. In terms of this plan landfilling is the last option to dispose waste in Brazil. It is unfortunate that currently Brazil is still disposing 90% of its waste in landfills which is contrary to its legal framework and action plan.

Whilst Brazil might have failed to implement and achieve its waste plan target, it is important to appreciate the success factor relating to the economic development impact of its waste sector. Recycling efforts in Brazil have managed to create over 300

000 jobs in both private and informal sector. Unfortunately Brazil has not made great strides in formalising its informal waste pickers through the enactment of waste laws that will recognise these pickers. The City of Tshwane, like Brazil and its cities, can exploit the economic development benefits of the waste sector by recognising and formalising the informal waste pickers / reclaimers and creating formal partnerships with them. The involvement of these pickers in the Brazil waste sector has demonstrated the 10% waste minimisation to landfill sites. The City of Tshwane can contribute to uplifting the lives of community members and inclusive waste management through integrating reclaimers into its waste management processes.

2.4.7 BOTSWANA

The Republic of Botswana is located in the southern Africa, north of South Africa. The country is a semi-arid country with an approximate surface area of 603 000 square kilometres and an estimated population of 1.7 million. Botswana has a small but rapidly growing population which has more than doubled in size in twenty five years. The country's population growth is estimated at 1.94% per annum (Central Intelligence Agency World Fact book, 2010).

The country's population increased between 1971 and 1996 from 584,644 to 1,495,993. However it is expected that the population will start to decrease slowly, averaging about 2.5% per year during the next decade, a rate at which the population will double within 30 years (Central Statistic Office, 1987; Ibid 1991, Ibid 2001). The Botswana have recognised the reality that a growing population will require more capacity and resources particularly on waste management. Whilst a healthy and growing economy is good for any developing country this positive development also contribute to other unintended negative outcomes due to a rising demand for goods and services provided by businesses, industries and Government. Botswana's main contributors of waste generation is related to urban migration, economic growth, under provision of waste equipment and resources, lack of waste minimisation interventions and societal attitudes (Kgati and Bolaane, 2001) According to the Economic

Commission for Africa (1996) the high consumption rates in Botswana have resulted in the country been one of the largest generators of solid waste in Africa.

The current method of waste disposal in Botswana is landfilling and the majority of solid waste is sent to landfills. This method of disposal is not only outdated due to limited landfill capacity but also very expensive. The increasing levels of consumerism and high population densities have contributed to urban areas in the country being identified as the highest waste generators.

Furthermore the lack of adequate waste management and proper control of waste disposal are the primary challenges on the sustainability of Botswana's environmental quality (Segosebe and Vander Post (1991) and Bolaane and Kgati 2001).

The lack of adequate waste management infrastructure has resulted in waste collection facilities delivered only to upper income neighbourhoods and low income neighbourhoods not receiving the infrastructure or service. This has resulted in waste not collected in these low income areas and villages being dumped and burned in the open thus releasing CO and CO₂ emissions. (Gwebu, 2003).

It is critical to note that 38% of the 250,000 tons of household waste produced in Botswana annually is actually delivered to disposal sites (Urio and Brent, 2006; Maburutse 2009). In the larger villages, 60% of residents have their refuse collected by the local authority compared to only 70% in rural villages.

Despite the country's challenges on waste management it is encouraging to note some of the positive steps that the country has taken to try and improve its waste management systems. Botswana has developed a waste management bill which was approved by its Parliament for waste disposal by landfill (Maburutse, 2009). A National Waste Management Project and Strategy was also adopted from which a number of studies were commissioned from 1996 onwards to evaluate the current waste situation in various sectors and to develop guidelines for improving the status quo. The waste streams that have been addressed include scrap metal, oil containing wastes, medical

waste, packaging wastes, industrial wastes, and tyre and battery wastes (Gwebu 2003; Urio and Brent, 2006).

Botswana is also a signatory to the Basel Convention that regulates transboundary movement of hazardous waste and their disposal. All movement of waste through the country is subject to the controls laid down in the agreement.

The country has also intensified the involvement of non-governmental organisations like Kalahari Conservation Society, Environmental Heritage Foundation and Somarelang Tikologo in the waste reduction and management efforts. Such involvement is also extended to private companies and the broader community. The Private companies like Kgalagadi Breweries use cans and returnable bottles for beer and soft drinks. This method encourages the reuse of material by companies and contribute to waste minimisation. Other private sector initiatives include the management of metal waste by companies like Scrapcor (Pty) Ltd who buy metal scrap from companies and public sector organisation. These initiatives also contribute towards job creation. Another level of involvement is that of the community through community programmes like Clean Up Botswana. Through the Clean Up Botswana programme volunteers develop waste management strategies that also includes recycling methods and analysing waste pollution. This community programme is striving to inspire all Botswana citizens to clean and conserve their environment.

The programme has recorded a significant increase in the number of volunteers and sites for the cleaning programme. Another significant increase in community participation has been the increase of community members in recycling services that are provided by local government as part of the weekly kerbside waste collection. The other recycling efforts take place in the industrial and commercial sectors. The country is now also investing on improved waste minimisation technologies to avoid dependence on landfilling. The involvement of the community and private stakeholders has demonstrated to be a critical factor in mitigating the waste management crises in Botswana. It is evident that once the country implements its waste minimisation technological interventions the country will be in a position to reuse, reuse and recycle

its waste through the participation and involvement of all its stakeholders. This is an important lesson that the City of Tshwane can draw from Botswana as a neighbouring country with similar characteristics. The main challenge for the future for all countries globally is to balance their aspirations for economic growth and the need to conserve their environment for future generations. The argument of the researcher is that such a balance can be achieved through the recycling of waste into commodities that can be used for economic growth. It is important to acknowledge that the failure to manage waste is largely as a result of the lack of adequate financial, technical, technological, and human resources to deal with the waste problem (Gwebu, 2003).

2.5 WASTE MANAGEMENT CHALLENGES AND OPPORTUNITIES

There is a perception that with increased populations, rapid urbanisation, globalisation and economic development, waste challenges are on the increase (Muzenda, Ntuli and Pilusa, 2012). It is estimated that in 2006 waste generated globally reached 2.02 billion tones which represented an annual 7% increase since 2003 and a further estimate of 37.3% between 2007 and 2011 which will be an equivalent of 8% increase per year (Global Waste Management Market Report 2007).

It is clear that whilst the generation of waste has increased substantially due to population and economic growth which has resulted in major waste challenges, this situation has also presented opportunities for the sector. As demonstrated in countries like Brazil that have major waste problems these problems also created economic opportunities for 300 000 unemployed people and most importantly can propel countries to craft a waste sector plan and/or strategy.

This is a clear demonstration that within the current waste challenges also lie progressive solutions that can ignite socio economic solutions for the country. The waste to energy model is a great opportunity for a county like South Africa which has been experiencing low energy capacity. The usage of waste to generate energy will not only assist with increased energy supply but also contribute towards waste minimisation efforts.

2.5.1 Urbanisation as a Waste Management Challenge

The development and economic growth of countries is normally driven by various commodities that are produced by such a country and sold to other countries. The geographical location of the production base of such commodities turns to be the driving force behind the creation or establishment of cities. This is a case in point with cities like Johannesburg after the discovery of gold. The direct and indirect outcomes of a booming city will be the creation of other secondary sectors like logistics to support the primary sector. These needs give rise to job and business opportunities which in turn encourage the influx of migrants from the rural parts or provinces of the country who seek better economic opportunities.

The influx of local and foreign migrants into cities is one of the fundamental underlying sources of waste management challenges in cities. It is important to note that whilst it is impossible to expand the geographical size of a city, the population of cities continues to grow and as a consequence even the waste generation is increasing and the current landfilling method of disposal is reaching crises point with diminishing number of landfills due to lack of space in urban areas (Roodt, 2001).

Globally, urbanisation of society has always brought with it positive and negative outcomes. In 2003, 50% of country's' populations lived in cities compared to only 10% a century ago. There is currently twenty three (23) megacities in the world each with a population of more than 10 000 000 and it is estimated that 13 more such cities will exist in the next decade (Global Environmental Change and Human Security, 2003). This growth is as a result of booming economies in these cities. However, such growth brings with it high consumption rates and high levels of waste generation. The bigger the city, the higher the volume of waste generated. This is demonstrated by the high volumes of waste generated by Dubai as the fastest growing city in the world. Dubai generated 6.600 000 tons of waste in 2003 which increased to 11 300 000 tons in 2005. This dramatic population and waste increases require urgent interventions to avoid an environmental catastrophe. It is worth noting that Dubai has since developed

a waste treatment model to mitigate its waste challenges. (Arabian Modern Equipment info, City Mayors 2006).

The same scenario is unfolding in South Africa in the metropolitan cities of the Gauteng Province which happens to be the smallest province with the highest urban migration compared to other provinces in the country. The Gauteng province accommodates 25% of the country's population (Stats SA Midyear population estimates 2017). This situation has resulted in the three metropolitan municipalities of the province struggling to meet the basic services of its residents due to increasing population with limited resources. Other African countries are also having the same experience, although the continent is ranked amongst the least urbanised regions of the world it is important to mention that amongst developing continents, Africa recorded the highest urban growth during the last two decades – 3.5% per year and this growth rate will be sustained until 2050 (Urbanization in Africa 2012).

It is important that African countries like South Africa start collaborating on waste management efforts that will seek to ensure that waste management solutions adopted at international forums like the Basel convention are implemented. According to Manser and Keeling (1996); Gupta, (2005) Pollution from municipal waste has become a threat to human health in modern times. Therefore, sufficient planning, resources and regulatory framework is required to anticipate and manage the negative outcomes of a growing economy and population. We have noted with excitement that over the past ten (10) years environmental issue have been receiving attention globally and the adoption of International protocols on waste have intensified the commitment of countries to adopt waste minimisation efforts. Rossitter (1995) argues that it is clear that controlled waste management generation will be the focus of the years ahead.

As part of the global village, South Africa and the cities in particular should be monitoring the growing population in order to anticipate the growth and allocate the required resources to mitigate this urban growth. Furthermore, cities like Tshwane should appreciate the commercial value of waste material which can be exploited to create job opportunities for the poor. It is also important for the City of Tshwane to

develop interventions and policies that are relevant for its communities and sectors (Godfrey, 2008). Other factors that are discussed in detail below influence waste challenges.

2.5.2 Financial Factors

One of the fundamental reasons that has caused municipal waste management challenges is the lack of financial resources. The cost of delivering waste services far exceeds the revenue received or generated from delivering this service (Sharholi et al., 2007). Whilst it is acknowledged and accepted that due to the legacy of apartheid and low socio economic conditions some communities particularly in region 01, 02, 05 and 07 of the city cannot afford paying for basic municipal services. However, it is critical to highlight the fact that in some instances communities have developed a culture of non-payment and expect the municipality to deliver services to them for free. (Sujaudhin et al., 2008). This situation has resulted in the city delivering the service at a loss against increasing fuel and labour costs. The city has to identify creative methods to minimise waste and its expenditure drivers like fleet, fuel and labour.

Another contributing factor is the lack of sufficient budget allocation for waste services by municipalities. The city is not investing in long term waste recycling and waste to energy equipment that will contribute to waste minimisation in the future. This lack of capital investment is not aligned to the green economy and integrated waste management plan of the city. The continuous budget allocation of operational expenses is not going to address the challenges but mitigate them in the short term.

It is common cause that budget allocation and prioritisation by government and municipalities is secondary to other critical services like housing, water, electricity, education and health services. It is largely in middle and upper class society that waste services and environmental issues are regarded as priority services due to the long term negative implications to the environment. In order to mitigate budget shortfalls municipalities have resorted to outsourcing their services to private companies to

avoid high fleet and labour costs related to in-house management of the waste service.

2.5.3 Lack of Active Citizenry

The responsibility to provide waste management service is a constitutional obligation of local government and therefore it is expected that the city fully implements and fulfils this mandate (Vidanaarachchi et al., 2006). However, it is unfortunate that there are no firm efforts by the government to get the communities to be part of the waste solutions since policies and strategies that are implemented without community buy-in will not deliver expected results. This is evident on the attitudes of city communities who practice illegal dumping and vandalism of waste and social infrastructure. It is not only desirable but critical that community centred interventions are developed to inculcate a culture of an active citizenry that will always be a solution to its challenges. (Sharholy et al., 2008). The case study of the community centred cleaning campaign by the City of Kigali in Rwanda is a demonstration of how an active citizenry can provide lasting solutions to its challenges. This participation should extend to policy and strategy formulations on waste management issues (Moghadam et al., 2009).

2.5.4 Cultural and Socio Economic

The waste management system of government or city should be based on the socio economic structure of its communities. A blanket system approach is not appropriate especially for a heterogeneous city like Tshwane (Schübeler, 1996). The cultural, ethnic and socio economic structure of a community has great impact on the type and volume of waste generated by such communities (Coffey and Coad, 2010; Schuler, 1996). The waste generated in the predominant affluent suburbs of the city in region 03 and 04 is different from the waste generated at the peri-urban regions of the city. The more affluent regions have become more conscious of environmental hazards and are more concerned about the cleanliness and hygiene of their environment. Affluent areas tend to generate high volumes of waste compared to poor areas. This

can largely be attributed to high income levels of middle and high class society living in affluent areas.

The level of awareness and attitude towards waste is different from one community to the other and is influenced by diverse cultural backgrounds (Schübeler, 1996). The attitude and awareness of the community can have an impact on the entire waste system from collection, recycling, payment, success and failure of the system (Henry et al., 2006; Schübeler, 1996; Yousif and Scott, 2007; Zurbruegg, 2003). The more affluent regions are prepared to pay for their service and expect such a service to be delivered consistently and according to schedule and applicable waste policies. However, in peri-urban regions of the city, the majority of residents do not pay for the service as a result of economic reasons but expect the service to be delivered consistently. However, it is also true that some residents have developed a culture of not paying for services and have a sense of entitlement to such service. Furthermore due to historical apartheid laws and racially based model of service delivery, poor areas have become so used to inferior waste service that it is common for such communities not to complain about the poor waste services. Such a situation has made it normal for certain communities to accept dirty environments and not look at waste services as an essential service. The attitude of the city and its communities will always determine the importance of such service. In countries where waste management is not seen as critical, the government has not made adequate budget and policy commitments, e.g. Latin American countries (Wilson, 2007).

It is therefore critical that the city looks at specific cultural and socio-economic intervention that will respond to diverse waste challenges. Such intervention will have to determine the volume and type of waste generated in these different communities in order to identify tailor made interventions for such a community. This will also assist with resource allocation for such intervention.

The consumption of communities is also influenced by cultural and socio-economic status with middle / upper class communities normally preferring to consume prepared meals with proper recyclable packaging whilst low class communities use unfriendly

environmental methods of cooking which ultimately has a negative impact on the disposal or recycling efforts (Coffey and Coad, 2010). Another socio-economic influenced waste situation is how waste is used by different community class groups. In the poor regions, organic waste is normally used to feed livestock and food containers used in the household whereas in the affluent regions there is high volume of paper due to high literacy rates and rich groups discard most of their durable items instead of repairing them. This example demonstrates how the city based on this cultural and socio-economic profile of its communities can be in a position to allocate the relevant human resources and equipment to efficiently deal with this challenges and cases.

2.5.5 Management

One of the chronic challenges associated with waste management services is the lack of leadership and competent waste managers. This is often a reflection of how a municipality perceive the waste management function. Waste Management is a specialised function which requires qualified and competent officials to manage and implement. Unfortunately due to political interferences, cadre deployment, academic qualification fraud and nepotism most waste managers do not have the necessary expertise to perform this function. (Chung and Lo, 2008). This is prevalent in small local municipalities and less prevalent in metropolitan cities like Tshwane. Furthermore, institutional management configuration of waste management is also undermined in most cases with the waste management services being managed as a division instead of a department. This institutional deficiency results in the waste management service competing with other services like environmental management, parks and cemeteries. This is currently the case in the city and such a situation must be reversed as a matter of urgency through the establishment of a waste management entity that is staffed with competent and qualified waste officials to deliver efficient waste services to all communities.

2.5.5.1 Status of Waste Management Workers

The collection of waste and conditions under which waste workers operate have demoted the status of waste workers to the lowest level and thus removed the sense of importance and fulfilment on waste workers when performing their job (Vidanaarachchi et al., 2006). It is a sad reality that these workers are paid low salaries and operate under hazardous conditions with no proper protective clothing. Due to the fact that municipalities normally outsource the waste collection service to private companies, most of these companies exploit these workers. This situation is a reflection of how the government, in particular municipalities and their political leaders give low priority to waste management services compared to other municipal activities (Moghadam et al., 2009). Furthermore there is nominal effort in providing training and skills development to municipal officials to improve their waste management skills (Sharholy et al., 2008)

It is envisaged that the city can review this situation by creating a positive and conducive working environment for waste workers which will translate to better performance and safety for these workers.

2.5.6 Political Considerations

The provision of basic municipal services is the primary purpose of existence of a municipality. In order for political parties to assume power they will have to promise voters that they will deliver better and efficient services to them. Whilst other national and provincial competencies have a huge bearing on municipalities, such becomes worse when municipalities fail to deliver their legislated mandates.

Over the years post 1994 we have observed spiralling service delivery protests which have subsequently resulted in a changing political landscape whereby some cities e.g. City of Cape Town which used to be governed by the African National Congress (ANC) have subsequently being taken over by the Democratic Alliance (DA). This trend demonstrates that whilst racial segregation might have been the critical demon that

had to be dealt with in the new dispensation, such a process also brought with it huge expectations on the delivery of basic services. The new Constitution of South Africa also obliges the city to provide a healthy environment to its communities and as such this is a legal mandate that the city must fulfil (Reddy, 2007).

However, it is important to realise that political parties prioritise the needs of their constituency in order to serve such needs once appointed into power. Therefore, given the cultural and socio economic outlook of a particular constituency such constituency will influence its political party policies. This means that the more leftist's parties will largely focus on social issues like housing, water, electricity and roads, whilst your middle class parties will give attention to green economy, healthy environment and renewable energy etc. This political influence is best reflected in the budget allocations of these parties once voted into power. This has been evident with the ANC government, which post 1994 has been focused on providing houses, electricity, water and roads at the expense of other services like waste services. The city's IDP process does not address this flaw since the process is also influenced by community inputs which always relate to basic services like water, housing, energy and roads. However in affluent suburbs of the city, waste issues do find prominence and hence such areas receive the best waste management equipment and services. These communities also drive and influence the city's waste management policies (Schübeler, 1996).

An inconsistent and poor waste management system is often used as a political tool to embarrass the ruling party since waste is tangible and a nuisance to a general public. Prior and during elections, political parties become environmental champions who monitor the delivery of these services since this can help to score political points. We have also observed how waste services can be used for short term job opportunities that will contribute to meeting politically influenced job creation targets.

Nevertheless, communities vote for parties that will secure and deliver their interest, therefore if communities do not have interest in environmental issues, their party of choice will not give priority to such issues (Friedland, 2007).

2.5.7 Legal Framework

A firm and progressive legal framework is critical for the transformation of the waste sector. Such a framework can be a tool that inculcate a positive waste management culture and rewards such behaviour through tax incentives and penalise bad waste practices like illegal dumping by companies (Asase et al., 2009). It is important that the legal framework is relevant for the city and its circumstances since any policy or by-law that is not relevant to its users will not have any positive outcomes. We have often observed how officials will import policies from other countries or cities without considering the unique circumstances of their cities. As a developing country it is important that our legislative framework is aligned to the realities of the country and its citizens. The city has developed by-laws that are aligned to the national waste management act and are relevant to the socio economic dynamics of the city. Unfortunately, these by-laws are not being enforced due to lack of capacity and integrated by laws approach. The delegation of the enforcement of waste management by-laws to the environmental health officials will go a long way in addressing this situation.

2.6 WASTE MANAGEMENT OPPORTUNITIES

The challenges presented by waste management should be looked at holistically since they also possess opportunities that can be exploited for the general wellbeing of the environment and community at large. It is critical that as a society we move away from the perception that waste has no meaning full contribution, but rather, be open minded about the conversion of waste into products or employment opportunities.

The separation of waste material from source has already proven to be an economic opportunity for the informal sector since unemployed people collect waste for income generation. This process can be expanded to local communities by encouraging communities to collect and separate waste at source in return of grocery vouchers that will be redeemed at participating retail outlets. This system will contribute towards poverty alleviation amongst the poor and create economic development opportunities

for local retailers. This will also reduce the high expenditure incurred by municipalities to collect and transport waste.

Proper waste management including waste reduction, costs money and the misconception that achieving zero waste can save money and create vast amounts of jobs must be corrected. The value of waste and amount to be made or saved is not linear with the amount of waste recovered for recycling, from the waste stream.

Other opportunities as demonstrated in the Swedish case study is the waste to energy model where waste is converted to energy and used to contribute to the countries energy grid. Due to the current challenges faced by the developing world, it is more important for these countries to exploit these waste management opportunities for a better society and clean environment.

2.7 WASTE MANAGEMENT: THE GLOBAL LEGAL FRAMEWORK

Local municipal governments have a role in the set-up and operation of waste management systems. Most urban authorities in both industrialized and developing countries receive their powers and obligations from a central government authority, with allocation of powers and responsibilities to protect the rights of the citizens, to provide services, and to serve the common good (Gidman et al., 1995).

The South African Waste Management Legal Framework is largely drawn from international policies and protocols. This means that the country is adopting to international waste management trends and solutions. It is evident that developed countries have adopted waste solutions that place emphasis and are focused on future development needs (Carter, 2001). Unfortunately, under-developed countries tend to look at immediate waste solutions to address current challenges without finding solutions to future challenges. This approach is a pending environmental crisis considering the rapid growth of cities in developing countries and the diminishing number of landfill sites.

A high number of developed and under-developed countries have adopted the waste management hierarchy as a solution for the future. (Gorstakis and Lewis 2003 and Seadon 2006). However, this solution is not appropriate in that whilst most countries are subscribing to it, such countries and waste officials do not have the authority and power to control production which can be used to ensure that recyclable products are produced instead of non-recyclable products.

The modern system of global environmental governance is to a large degree a consequence of the Rio Earth Summit 1992 and Agenda 21, which set in motion a series of multilateral environmental agreements (MEAs). In relation to hazardous substances and waste, two principal conventions apply:

- The Rotterdam Convention, acceded to by South Africa in 2002, promotes and enforces transparency in the importation of hazardous chemicals.
- The Basel Convention, acceded to by South Africa in 1994, addresses the need to control the trans boundary movement of hazardous wastes and their disposal, setting out the categorization of hazardous waste and the policies between member countries.

The intention and objectives of all these international protocols are noble and generally seek to protect the environment and ensure equitable balance between environmental preservation and economic growth and development. However, whilst in theory the aspirations of the country and those of the international world on environmental management and preservation are the same, the same cannot be said about the institutional deficiencies and capacity challenges of developing countries like South Africa.

The global legal framework on environmental management as committed at various international protocols is largely developed on first world standards with adequate

institutional capacity. This deficiency will result in developing countries not coming anywhere near to achieving the objectives of these protocols due to their lack of capacity, resources and infrastructure. Another critical deficiency facing under-developed countries like South Africa is the low level of its community's socio economic status compared to that of developed countries. Some of the deficiencies relate to the development and enforcement of appropriate waste policies and by-laws (Zurbruegg, 2003).

It is important that the international legal framework be cognisant of the deficiencies found in developing countries and allow such countries to set their own targets against their available resources and capacity. This means that these countries can be signatories of the international global legal framework with special conditions that their policies and strategies should be developed and implemented at a pace consistent to their capacity and resources. Setting uniform targets for these countries will result in non-compliance from them. Simple and focused legal framework for the city and other levels of government that is enforceable and progressive is critical to achieving global environmental standards (Coffey and Coad, 2010; Schübeler, 1996). A good example of the contradiction of the global legal framework is the "polluter pays" policy which is inappropriate for many developing countries due to the fact that the lack of institutional capacity to develop and enforce by-laws gives room to major waste generators to dump illegally. Some of the illegal dumpers are big corporates who often have more capacity and resources to undermine weak municipalities (Coffey and Coad, 2010; Henry et al., 2006).

Furthermore due to the lack of systematic and modern waste management information system it is always difficult for the local governments to develop proper plans due to the unavailability of reliable data (Jha et al., 2011; Shimura et al. 2001; UN-HABITAT, 2010). The lack of plans also involves the lack of funding due to the fact that most beneficiaries of waste services who are poor do not necessarily pay for their services and the municipality renders the services at a loss and cannot raise adequate funds to invest in modern technological equipment and system. The opposite cannot be said about developed countries. (Coffey and Coad 2010).

It is common for municipalities in developing countries to spend 20–50% of their available municipal budget on waste management, which often can only stretch to serve less than 50% of the population (Henry et al., 2006; Memon, 2010). In low-income countries, 80–90% of this budget is spent on collection while in high-income countries less than 10% is spent on collection services (Memon, 2010).

Due to rapid urbanisation and growing population in cities there are huge volumes of waste generated which have to be disposed. The urbanisation of cities does not only bring with it the waste challenges but also the growing demand for land which either makes available land expensive to purchase or prioritised for low cost government housing. This results in government establishing landfills at distant locations thus increasing the cost of transporting waste to the landfills (Memon, 2010). This situation results in the much needed resources being stretched to fund the increasing fleet costs instead of diverting such funds to procuring modern waste equipment that will provide efficient service. This is often caused by poor decision making as a result of lack of management capacity and also because of weak institutional processes (Zurbruegg, 2003).

Public participation is another critical process that must be integrated into the waste management legal framework. In order to find solutions relating to the wellbeing of the community it is essential to involve them. This will ensure that authorities are informed of the needs of the community against the waste challenges and unique circumstances of the community. This will make policies practical and easy to implement and enforce. Such an approach will avoid the policy failures caused by inadequate practical policy formulation and implementation (Konteh, 2009).

The prioritisation of the waste services is a chronic factor in many developing countries like South Africa. Due to the pressing socio-economic issues like housing, education, health, water and electricity issues like waste are often not prioritised. The tangible issues that will also bring about immediate political support tend to be given the necessary attention and resources at the expense of other important services like

waste services (Memon, 2010; Yousif and Scott, 2007). Unfortunately this political expediency is also compromised whenever there is a change in political leadership of the government. New leadership always brings with it their loyal administrative team which brings about change in processes and policies thus creating uncertainty and inconsistency in the implementation of waste services (Yousif and Scott, 2007). The lack of a long term political commitment normally results in the new leadership abandoning the policies and work of the previous administration at a huge cost and time for the government (Zarate et al., 2008). As observed with change in local government leadership in the country's metropolitan municipality including the city after the 2016 local government elections, the new administration will normally cancel or delay projects from the previous administration due to political expediency. The vat alles project in the City of Tshwane is a typical example of such political fallout (Henry et al., 2006).

The case of Brazil, Ghana and India demonstrated that these countries have good environmental and solid waste legislative framework. Unfortunately, this is not the case in terms of policy implementation and practice due to a lack of compliance, enforcement, and monitoring. The reasons are many, some of which include human resources through a shortage of skilled staff, insufficient or inappropriately allocated operating budgets, apathy towards non-compliance by local government, and so forth (Costley, 2007). In order for these countries to ensure that its waste management legal framework produces tangible results they must ensure that there is maximum enforcement of the by-laws by municipalities , recognise reclaimers , create maximum education and awareness on the impact of waste , legislate recycling and penalise municipalities that do not reduce their waste to landfill annually.

2.8 DISCUSSIONS

It is evident that from the theoretical review that whilst there is a sound international legal framework on waste management such framework has proven to be difficult to implement and enforce in developing countries. Developing countries as part of the global village have signed up on all relevant environmental management protocols

and targets. Unfortunately, due to the large burden of socio-economic challenges these countries struggle with human and funding resources to comply with these protocols. Ghana as indicated in the case study, has developed a good legal framework that has strived to meet International protocols and subscribe to international standards. Such a framework has proven to be effective in the urban and affluent areas of the country. Unfortunately this sound legal framework has failed to give recognition to the role of the informal sector on waste management especially given the socio economic challenges that the country is facing.

Zarate et al.,(2008) emphasises that managing waste is a complex task that requires appropriate technical solutions, sufficient organizational capacity, and co-operation between a wide ranges of stakeholders. According to Seadon (2010), the interdisciplinary and multi-sectoral considerations needed for the proper management of solid waste – manufacturing, transportation, urban growth and development, land use patterns, public health, etc. – highlights “the interaction and complexity between the physical components of the system and the conceptual components that include the social and environmental spheres. When waste is seen as part of a larger system, the relationship of waste to other parts of the system is revealed and thus the potential for greater sustainability of the operation increases.

Developed countries have also succeeded in applying different treatment and re-use methods for the generated municipal solid waste, including; recycling, composting, and energy recovery, in addition to the disposing of the waste in proper landfills. It is therefore critical that despite challenges faced by developing countries, these countries should invest in technologies that will help in recycling and reusing their waste for the benefit of their countries e.g. waste to energy.

Existing studies on solid waste management also point to the relationship between governance and solid waste management. Tevera (1991) cites urban solid waste disposal problems as indicative of economic policy failures at either local government level or national governments. He further attributes the presence of inefficient solid waste management systems to poor revenue base, which precludes meaningful

investment in solid waste infrastructure and hampers maintenance of equipment. MacGranaham (1991) and Amis (1992) have cited administrative incapacity and institutional weaknesses as major factors accounting for poor solid waste management systems in developing countries. However, this stand point is refuted by Hardoy *et.al* (2001) who defensively argues that prolonged underinvestment is the major factor that leads to deterioration of the quality of solid waste management systems.

It is evident that the gap is too wide between developing countries and developed countries on waste management and compliance with the international protocols. The universal 3R model is not implemented fully in developing countries with the diversion of waste to landfill still averaging 90% whilst developed countries like Sweden recycle 90% of their waste. However as demonstrated in the case studies the socio economic status of the citizens and countries play a huge role in this situation. It is important that developed countries use their circumstance positively to transform the current waste management challenges. This can be achieved through supporting the informal reclaimers and investing in technology.

2.9 CONCLUSION

It is clear from the theoretical review that municipalities and industries in developing countries currently do not give sufficient attention to waste minimisation. The fact that developing countries still divert 90% of their waste into landfill sites is a serious setback for waste minimisation efforts and targets. This impacts negatively on their operating and capital cost structures associated with collection, transport and disposal. However as shown in the case study of Sweden ,waste minimisation and reuse of waste material can have a positive impact on the economy whilst at the same time ensuring the cleanliness of the country and local cities. The case studies of Ireland , Sweden and San Francisco on the use of technology , recycling and enforcement of waste by-laws has provided possible solutions to the current waste management challenges in developing countries.

The recycling of waste to energy in Sweden is another case studies that can provide solutions to the current energy challenges faced by developing countries particularly in the African continent. With the current electricity crisis and the country high cost of living which is affecting the poor, waste to energy is a creative option to alleviate this challenge.

Another interesting and relevant waste management lesson is the recycling of waste in exchange for grocery vouchers in Sweden. Cities in developing countries generally, have an extensive solid waste informal sector that operates at the edges of a more formal solid waste system, often driven by groups of scavengers from local communities (Diaz et al, 2007, Spies et al, 2007, Matete and Trois, 2008). The lack of policies that recognise this aspect, particularly within the cities of developing countries is a problem that needs to be attended to given the high unemployment and poverty levels.

Broadley and Cunningham (1992) note that advancing technologies and the specific location of industries results in consequential patterns of population density and distribution. Whilst the current plan covers the capacitation of the waste management departments, it must be noted that the current cash flow challenges experienced by the municipalities in developing countries will make it difficult for such challenges to be addressed in the immediate future. This factor is further compounded by the inability of the municipalities to levy the correct rates for waste management and collection thereof, thus creating a scenario where the cities are providing the service at a loss and using very expensive methods of providing the service without the latest technology and creative methods.

A strong leadership and political will at all levels of government is another success story drawn from the Sweden, Ireland and San Francisco waste management story. This means that at administrative level all levels of government must have strong and competent officials who will ensure that proper waste management plans, policies and strategies are developed and implemented.

The documented case studies on Sweden, Ireland and San Francisco have demonstrated that it is possible to have a clean country or cities when there is a strong commitment towards dealing with waste management challenges. The process to achieve this is a long and painful process which once achieved benefits all. It is therefore critical to emphasise that in order for developing countries to address their current waste management challenges, such countries have to be prepared to commit to documented strategies and enforce their waste management legal framework.

The next chapter will focus on the implementation of waste management services in the study region and assess it against global practices.

CHAPTER 3: IMPLEMENTING WASTE MANAGEMENT IN THE CITY OF TSHWANE

3.1 INTRODUCTION

The delivery and management of waste services is a global challenge in developed and under-developed countries as demonstrated under chapter two (02) of the study. The rapid economic growth of countries which translates to rapid urbanisation and creation of cities gives rise to a number of challenges which includes the management of waste. The high cost of living in cities has contributed to a spiralling number of informal settlements on the outskirts of the cities. These settlements are normally established illegally on land that is not zoned for residential settlement or conducive for human habitation. As a result it becomes difficult to service these areas as and when they have to be serviced.

This chapter reviews the implementation of waste management policy in the City of Tshwane. The importance of a theoretical review reviews in dissertations of this nature lies in the opportunities given for identifying more appropriate models for tackling the challenges confronting society. According to Roodt (2001) and other leading development analysts on waste management, learning from other regions has the potential of providing lessons in best practice on how to mobilize communities to effectively implement development programmes and projects.

It is common cause that the city is facing future challenges with its current landfill sites rapidly reaching their operational capacity which will result in huge financial and environmental challenges in establishing new landfill sites. (CoT AAIP 2013). Due to the growing urban development and need for commercial and residential development the city is also running out of open land that can be used to develop new landfill site. This reality is forcing the city to explore other alternative waste management practices that will address its challenges. There is a need to look at alternative and innovative ways in dealing with the waste burden within the context of the emerging green economy and the need for job creation in a developing economy and an imperative of

the National Planning Commission (CoT GDS 2055). In a country that has massive unemployment rate of 26.5 % (Stats SA 2017) it is critical that the challenge of waste management can be translated to a basket of opportunities that can bring strategic advantage to a region and its society by creating employment and development opportunities for communities.

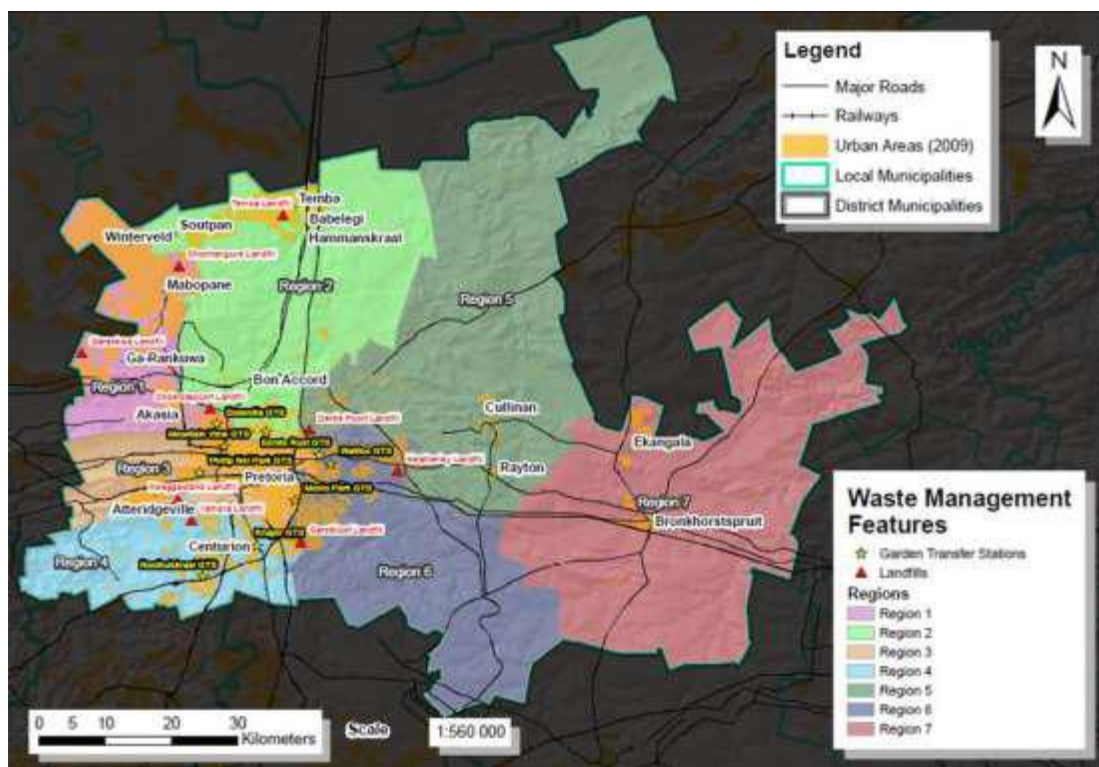
A balance needs to be made with the economic development of society and the preservation of the environment. The focus on economic development at the expense of the environment can lead to serious health and economic implications for environmental practitioners and society (Hill *et al*, 2006).

Failure to draw a balance or develop creative interventions that will ensure that the rapid development and population of metropolitan cities adequately respond to the challenges that such phenomenon will present in the future. The current failure by local authorities to design, develop or adopt modern technologies that will provide solutions to the waste challenge does not only pose catastrophic environmental situations but also noncompliance with local and international waste management legislation and protocols.

3.2 OVERVIEW OF WASTE MANAGEMENT IN THE CITY OF TSHWANE

The City of Tshwane is located within Gauteng Province the smallest of South Africa's nine provinces, and by far the country's largest economy, is home to about 3 million people. The City of Tshwane is the second highest contributor to the Gauteng Province's economy, at an estimated 27.8% of Gauteng's gross domestic product (GDP) (Census 2011). It is South Africa's capital city and seat of government and the 'diplomatic capital' with over 130 diplomatic missions and 26 international organisations represented in South Africa– second to Washington DC. Another important attribute of the City is that it is the country's 'intellectual capital' with several research, development, and public higher education institutions. (City of Tshwane GDS 2055). The City of Tshwane is a neighbour to two other metropolitan municipalities within the Gauteng Province, City of Joburg and City of Ekurhuleni.

The City of Tshwane was officially established in December 2000, an amalgamation of 13 former city and town councils. In 2007, the Metropolitan Municipality approved a plan to implement a service delivery model which was based on 5 planning regions. This number has been increased to 7 planning regions after the incorporation of the erstwhile Nokeng and Kungwini Municipalities (City of Tshwane Socio Economic Review. 2011). Under the current political dispensation in South Africa, Pretoria is administered by the City of Tshwane (CoT).



Map 1 (Source: City of Tshwane 2013)

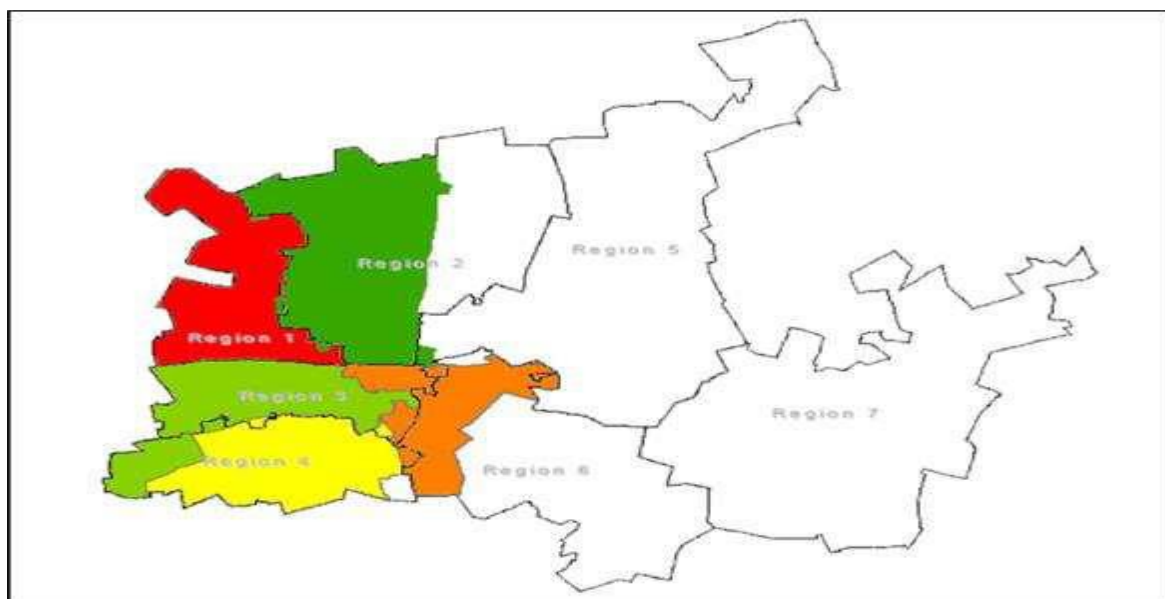
Map 1. Illustrates the waste management features of the city per region. It is clear from the illustrated map that the geographical spread of region 01, 02, 05 and 07 is bigger than region 03, 04 and 06. Furthermore, the distance between the regions and landfills is also illustrated. It is important to note that region 05 and 07 do not have a landfill site and have to rely on the heatherly landfill site in region 06. This challenge requires intervention to address the high cost of landfilling waste in these respective regions.

The medium and long term plan should be to implement waste minimisation efforts to address the challenge. The racial composition of the city is shown in the table below:

Table 3: Racial composition of the City

Race groups	Figures
Black African	2.2 million (75%)
Whites	586,000 (20%)
Coloureds	59,000 (2%)
Indians	54, 000 (1.8%)
Others	19,000 (0.6)
Black African	2.2 million (75%)
Whites	586,000 (20%)

There are now 105 wards in the city with 210 ward councillors. The city is divided according to seven service delivery regions (See Map 2).



Map 2 : Service Delivery Regions: (CoT IDP 2011/16)

- Region 1: Mabopane–Akasia,
- Region 2: Hammanskraal - Temba
- Region 3: Die Moot and CBD

- Region 4: Centurion
- Region 5: Cullinan and Rayton
- Region 6: Menlyn, Pretoria East and Mamelodi
- Region 7: Bronkhorstspuit

Map 2. Illustrate the seven planning regions of the city and their geographical positioning and size. The four study regions (1, 2, 5 and 7) are in the peri urban areas of the city and entail large agricultural land which some has been occupied by informal settlement.

The majority of the population falls within the working group (19-64 years) with most of the population in the 20-39-year-old age group – this indicates a relatively young population. The male and female ratio can be assumed to be relatively equal (City of Tshwane Integrated Development Plan, 2013).

The above growth of the city has developed it into a very large and dispersed metropolis featuring numerous challenging characteristics including low density sprawl, fragmentation, and separation of functions and land uses. These all have a direct bearing on waste management services as the metropolitan area is vast which has an impact on the time needed to deliver services and travelling costs; land uses are fragmented which means the consumer distribution is spread across the city, and there is a continual demand for services due to population growth and urbanisation placing pressure on waste services, budget, staff and fleet.

Historically, municipal boundaries in South Africa were structured in accordance with the racial demographics of the population of a particular jurisdiction. For instance, in terms of the Group Areas Act of 1959 (which is now repealed), a specific racial group was not allowed to reside in an area designated for people of a different race. However, since democratisation in South Africa in 1994, much has changed. Since 1994 municipalities have been structured to be people-centred, accountable and

democratic, with the goal of providing services to communities in a sustainable manner.

The colonial period in South Africa (18th and 19th centuries) and that of the Apartheid regime saw the introduction of the Group Areas Act (1950 and 1966) which led to land use zoning racial segregation (Pacione, 2001; Zetter et al., 2002). Most of these racially marginalized zones were not entitled to basic infrastructure and municipal services such as potable water, safe sanitation, tarred roads, community centres and refuse removal (Sandercock, 1998; Pacione, 2001). This can be perceived as the reason why negative cultural waste behaviour like illegal dumping is prevalent in the historically disadvantaged areas of the city which are found in region 1, 2 5 and 7.

According to Thornhill (1995) the success of any local government action is determined by the perceived quality of services rendered to the community by officials acting on behalf of the municipal council. In South Africa, local government is confronted with the following challenges, among others:

- the inability of municipalities to financially sustain themselves;
- the lack of capacity to deliver constant and regular services; and
- the failure of officials to comply with regulations (

The historical under development of the historically disadvantaged areas has left a negative service delivery backlog which requires aggressive and immediate interventions. . The city as an authority has an important role to reverse the imbalances of the past and provide sustainable and quality waste services to these communities irrespective of their socio economic status. This can be achieved through awareness programmes, recycling and waste to energy.

It is important that within the existing waste management challenges the city exploit creative and alternative waste interventions that can also deliver economic development opportunity for the municipality. The need to look at alternative waste

management systems like waste minimisation and waste to energy, is becoming necessary due to the fact that existing waste disposal facilities are rapidly reaching their operational capacity and there are high environmental challenges in establishing new waste disposal sites.

At this stage the city has 05 operational landfill site from an original 08 sites after the closure of Garstkloof, Temba and Kwaggasrand landfill sites (CoT IWMP 2014). This means that the city has no operational waste disposal facilities in the south and west of the city. The increased operational cost on the city and its contractors of transporting the waste from these regions of the city to the north and east of the city has been significant. This has also led to inefficient and inconsistent waste management services in those regions. Furthermore, the south and western regions of the city represents the disadvantaged areas of the city which draws emphasis on the perception that waste management services are efficiently provided in the affluent areas.

Most of the waste from Garstkloof and Kwaggasrand waste disposal facilities has been diverted to Hatherley and Onderstepoort waste disposal facilities respectively. This has reduced the estimated useful lives of these landfills with the result that Onderstepoort, the city's busiest waste disposal facility, now has an estimated useful life of less than 2 years (CoT AAIP 2013). The next closest landfills to Onderstepoort are Ga- Rankuwa and Soshanguve waste disposal facilities which are situated in residential areas. Diverting the volumes of waste that these landfills receive and more importantly diverting the number of trucks that transport this waste into these residential areas, is not feasible.

The estimated annual volume of waste disposed of to landfill in the Tshwane area alone (i.e. excluding Metsweding) in 2011 was estimated at 1 443 290 m³ (statistics provided by the city's waste officials). Compared to the available airspace, and taking into consideration a 2% annual increase in volume, it is calculated that before the closure of the 5 waste disposal facilities, the city still had about 22 years of landfill space available. Of concern though is that the rate of disposal is not equal throughout

the city, and some landfills are being overloaded (Hill and Associates, 2011). This is growing at the rate of 4% per annum since 2004 and 7% per annum since 2008. Verification of these figures may be required in future to determine future landfill requirements; however, the pressure on landfill airspace cannot be disputed. (City of Tshwane Integrated Waste Management Plan 2014)

Against this background, there is a need to look at alternative and innovative ways in dealing with the waste burden. In March 2014, the city's executive council passed a council resolution approving the alienation of the site for the development of the first of four planned multi-purpose, recycling initiatives meant to divert the main recyclable waste streams from landfill being dry, recyclable waste, green waste and building rubble (CoT GDS 2055). It is unfortunate to note that to date these recycling site have not been completed and thus do not serve the city. These facilities need to be viewed within the context of the emerging green economy, and the need for job creation in a developing economy and are an imperative of the national development plan (NDP). This means that what we perceive as a challenge of waste management can be translated to a basket of opportunities that can bring strategic advantage.

It must be noted that the city recorded growth in terms of refuse removal services by the city or private company from the Census (1996) and (2001) respectively. However the city is still behind the City of Joburg which recorded 97% and City of Ekurhuleni which recorded 89% (Stats SA Census 2011). As a capital city, the City of Tshwane is expected to be the best model in terms of provision of basic services. Whilst these statistics can present a positive outlook from a service delivery point of view, it is unfortunate to note that they still contradict the Polokwane declaration on waste minimisation and landfilling. It is for this reason that the city must implement new efficient and sustainable waste services methods. This will assist the city in allocating resources to other service delivery needs like roads, water, electricity and use waste as a resource that can be recycled and provide employment opportunities or be used as an alternative source of energy.

The empowerdex service delivery index (Citydex 2009) rated the city as the lowest on service delivery compared to other metropolitan municipalities. This relates to the provision of basic services like electricity, water, sanitation, refuse removal and roads. It is important to mention that with creative interventions on waste services the city can improve its general service delivery profile and use waste as an input on some of the service delivery targets such as the waste to energy programme.

Beyond the above reasons, it is important to note that the city has experienced a number of service delivery protests, particularly in the identified service delivery regions which predominantly accommodate historically disadvantaged communities of the city. The grievances that are normally expressed at these protests are related to municipal services like lack of waste refusal, electricity, water, sanitation, or roads – is the most frequently cited category of grievance.

It is for the above reasons that this study focuses on the underlying causes of this situation and the identification of possible corrective interventions that will seek to assist the city in addressing its waste management challenges and living up to its status as a “Capital City of Excellence”. In view of the importance of the waste management service delivery sector in the development of South Africa, the monitoring of the waste service delivery achievements and failures needs to occupy the attention of individual households, communities and organizations at informal public meetings and at official government indabas (Market Research Solutions. 2008).

3.3 WASTE MANAGEMENT POLICIES AND LEGISLATIVE FRAMEWORK IN THE CITY OF TSHWANE

The Constitution of the Republic of South Africa, 1996 states that the people of South Africa have the right to an environment that is not detrimental to human health. It imposes an obligation on the state to promulgate legislation and to implement policies to ensure that this right is upheld. The government has to date taken the following steps to ensure the environmental right include: the publication of the Environmental

Management Policy for South Africa (1998); the White Paper on Integrated Pollution and Waste Management (IPWM) (2000); the National Water Act (1998); and the promulgation of the National Environmental Management Act (1998). A further step was the development of the National Waste Management Strategy (NWMS) for South Africa (2000). The policy on Integrated Pollution and Waste Management (IPWM) sets the following specific goals in respect of waste and pollution:

- to prevent, reduce and manage pollution of any part of the environment due to all forms of human activity and in particular from radioactive, toxic and other hazardous substances;
- to set targets to minimize waste generation and pollution at source and to promote a hierarchy of waste management practices, namely reduction of waste at source, re-use, recycling and safe disposal as the last resort;
- to regulate and monitor waste production, to enforce waste control measures, and to co-ordinate the administration of integrated pollution and waste management through a single government department; and
- to promote cleaner production and to establish mechanisms to ensure the continuous improvement in all spheres of environmental management.

In September 2001, at Polokwane, government, business, labour and civil society worked on a joint approach on future waste management in South Africa. At the conclusion of this national waste management workshop, the Polokwane Declaration was signed, which committed government, civil society and business, to work together toward achieving 50% reduction in the volume of waste generated and 25% reduction in volumes of land-filled waste by 2012 and a zero waste plan by 2022.

It must be highlighted that 15 years later the targets of the Polokwane declaration have not been met. According to the (2009) Gauteng Provinces State of the Environment Report all its municipalities in the province were recording 90% waste to landfill site with 10% of waste recycled. This record a material deviation of 15% from the set target. It is clear that municipalities as the relevant spheres of government that deliver waste

management services have a long way to go in achieving the Polokwane targets and complying with the National Waste Management Act. According to the National Waste Management Assessment Report (2009), the following issues contribute to municipalities' inability to render an efficient waste management service:

- lack of capacity to implement by-laws;
- poor institutional capacity;
- no system for skills transfer, i.e. no sustainability;
- lack of awareness amongst both designated authorities and communities;
- Lack of expertise.

Waste management is also affected by the aspects or enabling factors that facilitate the performance of the system. They are: technical, environmental, financial, socio-cultural, institutional and legal. Literature suggests that technical factors influencing the system are related to lack of technical skills among personnel within municipalities and government authorities (Hazra and Goel, 2009), deficient infrastructure (Moghadam et al., 2009), poor roads and vehicles (Henry et al., 2006), insufficient technologies and reliable data (Mrayyan and Hamdi, 2006).

The city has developed solid waste by-laws, which reflect a solid waste management 'business-as-usual' approach. For example, waste minimization is not defined, nor are there any measures to incentivise waste reduction. This is in total contradiction to the objectives of the National Waste Strategy (CoT AAIP 2013). Such an approach is consistent with the reluctance by local government in general and city in particular to implement creative and firm methods in its policy formulation, implementation and enforcement. Policies that are not implemented and enforced will remain documents that do not have any effect. The cornerstone of service delivery in the public service is embedded in its policies and implementation and enforcement of such policies. This simply demonstrates the failure by the city to develop policies that are reflective of the practical challenges and possible opportunities of its environment.

The city's growth and development strategy identifies waste management as a sector that can contribute to its local economic development interventions. However, such an opportunity is not firmly expressed in its by-laws. This demonstrates the lack of creative interventions which can be attributed to lack of capacity within the Environmental Management department.

Whilst South Africa's legislative framework is aligned to all international protocols and new waste management systems, it is unfortunate to note that the city is failing to implement the waste minimisation systems as prescribed by the National Waste Management Act and the National Waste Strategy. The city is still diverting 90% of its waste to landfills (CoT AAIP 2013). It is clear that based on the current trends the city will not be in a position to efficiently manage its waste management challenges or comply with its legislative obligations. In order for the city to change the current trends, robust waste management interventions from a technological and legislative point of view will have to be examined, explored and ultimately implemented.

One of the most critical role of the state is to develop multiple legislative framework to properly manage the waste sector (Yusuf, Othman and Nashim, 2002). The need to use the legislative framework is captured in the writings of Ahmed and Ali (2011) and Oteng-Ababio (2012). One of the positive provisions of the city's IWMP is that it views waste management as an opportunity to advance the informal economy in terms of waste recycling, reuse, waste material recovery, job creation and income generating opportunities (CoT IWMP 2014). However, the unfortunate part is that this provision is not translated into tangible actions where there is recognition that the informal sector can play a meaningful role in waste management.

Reclaiming (scavenging) is rife in many parts of the world including Asia, Africa and Latin America and is documented in a number of studies (Rogerson 2001; Samson 2008; Zaman & Lehmann 2011; Beall 2002; Medina 2002). It is an essential survival strategy for the poor (Rogerson, 2001: 247). However, these activities are not always welcomed by municipalities in various regions. This is evidently the case also in the City of Tshwane. Reclaimers have a difficult relationship with the municipality and this

has led to a situation where the former have “taken over” or ‘hijacked “the Heartherley landfill site from the municipality and operate under very hazardous conditions.

In most cases the reclaimers are stigmatised and subjected to municipal repression (Rogerson 2001). In Sub Saharan Africa, many poor people make a living through reclaiming a variety of recoverable materials from waste sites (Mangizvo 2010). The waste recovery activities of the informal reclaimers provide waste recycling companies with raw materials (Rogerson, 2001; Mangizvo 2010).

The continued harassment of reclaimers and their exposure to unsafe working environments within the landfill sites of the city contradicts the intentions of the city’s IWMP to formalise the waste management informal sector and create economic and employment opportunities from this sector. It is proper that the city implements this part of the IWMP to ensure that its waste minimisation efforts also address the socio-economic challenges that are facing the city through the creation of economic opportunities for unemployed local community members.

The inclusion of the waste informal sector and the commercialisation of solid waste is one of the important developments that must take place in order to transform the waste sector for the benefit of the poor communities. This will create jobs, entrepreneur opportunities and contribute towards waste minimisation. Such a process can be augmented by the enforcement of by-laws with particular focus on major corporate plants to mitigate air pollution and toxic waste dumping. This also includes the construction sector in relation to the disposal of building rubble.

According to the United Nations Development Programme (UNDP 2009), local government is failing to enforce by –laws against major companies due to lack of capacity, resources and will. In modern society municipal solid waste has become one of the most critical threat to society (Manser and Keeling, 1996; Gupta, 2005).

The community survey conducted by Statistics South Africa in 2007 demonstrated that the task of maintaining cleanliness in the major metropolitan cities of South Africa

constitutes a huge undertaking for local governments and municipalities due to an influx of migrant labourers into towns and cities in search of job opportunities.

The rapid influx of people to the city in search of better economic opportunities poses a huge waste management threat (Gupta 2005). Current population growth, urbanisation and waste generation rate will inevitably lead to excessive pressures on the environment, thus demonstrating the need to evaluate alternative methods and systems for waste management within the city.

It is therefore important that solutions to waste management challenges should be addressed by humans through consistent health education on environmental sanitation and primary health care, socioeconomic incentives as well as a strict enforcement of municipal by-laws are all needed for ensuring overall environmental cleanliness and the efficient management of waste in metropolitan cities such as Tshwane. A carrot and stick approach is also encouraged to provide incentives to businesses and community members in minimising their waste. This can be achieved through tax rebates to companies and community members that follow strict waste minimisation processes whilst at the same time high tax penalties are levied against companies and community members who continue to accumulate waste. All these efforts are aimed at implementing interventions that will minimise waste.

It is also important to encourage and incentivise waste workers as custodians and implementers of the City's waste management policies and strategies. This is critical since the lack of performance by this group of officials will render the developed policies and strategies null and void. Waste workers are associated with low social status (Vidanaarachchi et al., 2006). This situation result in low motivation among the solid waste employees and which translate to poor performance. The profile of this service must be promoted to improve its status and encourage waste workers. This can be achieved through consistent skills development programmes, decent salaries and conducive working environments.

Beyond the recognition and capacitation of its waste workforce the city also needs to provide the necessary waste infrastructure like skips and bins to ensure that communities have access to this infrastructure. Failure by the city to provide the infrastructure like it is the case in most informal settlement will simply result in the mushrooming of illegal dumping sites. It is clear that legislation and by-laws only will not improve the current waste management challenges in the city. Improving internal capacity, resources, education and awareness, political will, creative solutions and enforcement of by-laws will improve the current situation. Unfortunately, South Africa has always proven to be good in developing good policies and plans, but come short in the implementation of such plans. Whilst the city has developed an IWMP which encourages the 3R's model, the reality is that the city is still dumping 90% of its waste at landfill sites contrary to the objectives of the IWMP and the Polokwane Declaration. This is another good example of ambitious plans and policies that are never implemented. It is recommended that the city use its legislative framework to address its waste challenges similarly to countries like Sweden, Ireland and USA.

3.4 IMPLEMENTING WASTE MANAGEMENT SERVICES IN THE CITY OF TSHWANE

The Constitution of the Republic of South Africa, 1996 obliges directs government to implement basic waste management services to its areas of jurisdiction. The city is fulfilling this constitutional mandate and has allocated this responsibility for the solid waste function with its Waste Management Services Division in the Environmental Management Services Department.

Waste collection, excluding waste disposal sites, is now performed by the regions. The waste management function falls within the cluster under the responsibility of the Deputy City Manager: Operations (as per the approved CoT Organisational Structure, 2012). The political accountability of the waste function is led by the member of the Mayoral Committee responsible for agriculture and the environment.

Waste generated within the city can be divided into the following categories (CoT IWMP 2014):

- Domestic waste (household waste);
- Industrial and commercial waste (business waste);
- Construction waste (building rubble);
- Hazardous waste (including oxides, oils, fluorescent tubes, paints);
- Garden waste; and
- Agricultural waste.

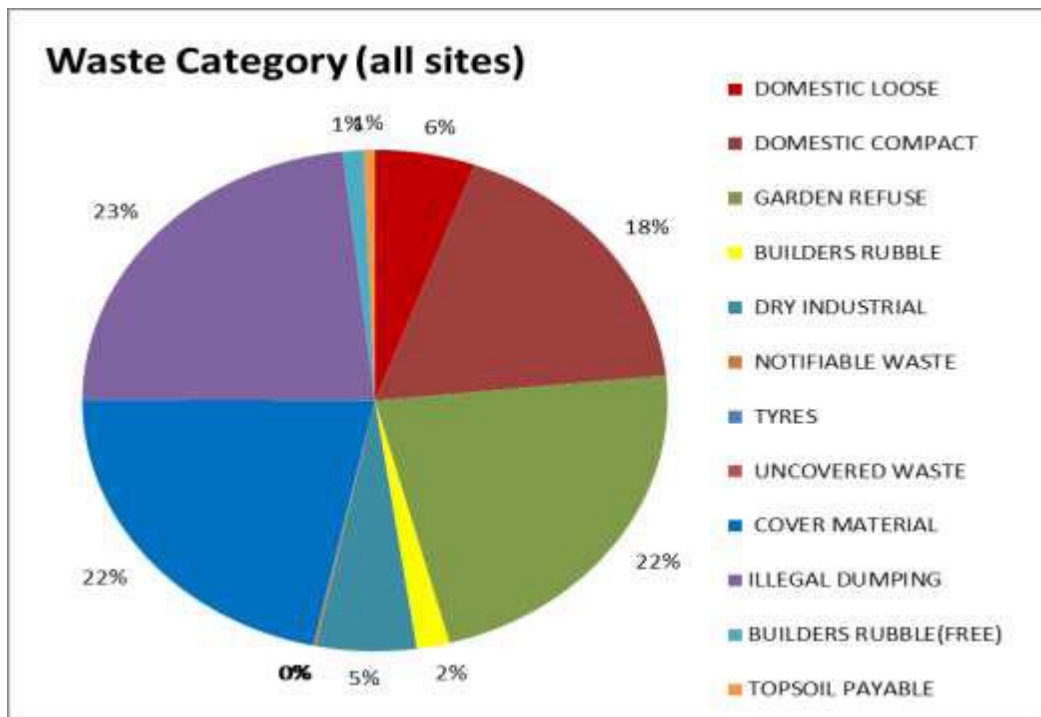


Figure 1: City of Tshwane Waste Categories (CoT IWMP 2014).

According to figure 1 the city's waste category reflects that the highest volumes of waste generated is from garden refuse 23%, illegal dumping 22% and builder's rubble. This report should begin to guide the city on interventions that can be implemented to address the above which account for 67% of waste in the city. (CoT IWMP 2014).

The municipal waste generation per capita differs noticeably across income groups, with low, middle and high income groups generating an average of 0.41, 0.74 and 1.29 kg/cap/day respectively. Using average waste generation rates for South African society as 0.8 kg/person/day equates to an annual waste generation rate for Tshwane to be 685 000 ton per annum (tpa). This equates to per capita contribution of 0.3 ton per capita per annum. The corresponding figure from Hill & Associates, Air Space Assessment Report, (2011) yielded a figure of 0.72 ton per capita per annum.

The discrepancy in this varying per capita contribution may be due to the lack of functional weighbridges at the city's waste disposal facilities and the volume data being based on estimates based on the maximum axil load per truck. A further shortcoming which has been identified is improper demographic data. The Census data for 2011 indicates that a total of 109 584 service points are in informal settlements and 3, 3% of households do not have access to waste removal services. This may have an implication in waste contribution to the waste disposal facilities.

A key issue that the city needs to address is to verify the number of service points. The number of customers is a key consideration in the allocation of resources (both financial and human) to meet the service delivery needs and to eliminate any under invoicing for services by the City of Tshwane. This exercise will confirm the completeness of revenue from an audit perspective and assist the city to set sustainable tariffs based on efficient waste removal services.

CURRENT WASTE SERVICE MODEL OF THE CITY OF TSHWANE

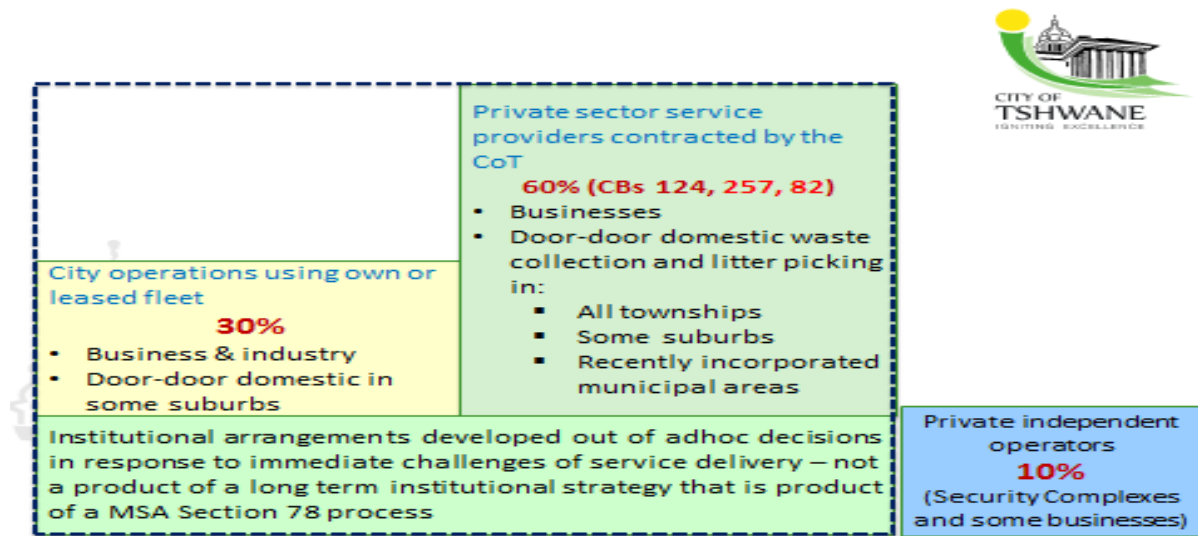


Figure 2: City's Waste Model for Waste Management (CoT IWMP 2014)

Figure 3 illustrates the current waste model of the city in terms of waste collection. It is clear that the city has outsourced its waste collection since 70% of waste collection is done by private contractors whilst only 30% of the services is implemented by its own staff. This model gives credence to the process of privatising the waste service function through the establishment of a waste management entity that is managed like a company based on the companies act principles. The downside of this model is the potential to make waste services an expensive commodity that might not be affordable to the poor communities in region 01, 02, 05 and 07. It is therefore necessary that the city as major shareholder of the waste entity once established regulate the tariffs of the entity.

The current waste model of the city is not documented on any strategy nor policy, therefore it appears that the current waste services institutional arrangements were developed out of ad-hoc decisions in response to immediate challenges of waste service delivery. It is important to note, however, that the city is currently embarking on a Section 78 assessment according to the Municipal Systems Act to determine the feasibility of establishing the waste entity. This Act provides for a process for deciding on the mechanism to provide municipal services through an assessment of direct and

indirect costs and benefits, the municipality's capacity and potential future capacity to furnish the skills, expertise and resources necessary for the provision of these services. The act prescribes that the views of the local community, the likely impact on development and employment patterns in the municipality; and the views of organised labour should be considered in implementing a municipal entity (CoT AAIP 2013).

In respect of internal capacity, there is a Waste Services Division within the Environmental Management Services Department of the Municipality. The city opted to implement a regionalised system of service delivery which aims to bring service delivery closer to the local communities. Co-ordination and alignment between the corporate office and the regions takes place through interfacing with the service delivery transformation and management unit. This is important as the corporate office reports to the SED: Environmental Management Services, whereas the regions report to the SED: Regional Services. There has to be constant communication and alignment between corporate policy and on the ground operations. (CoT Annual Report 2015/16).

The study conducted by Snyman and Vorster (2010) has pointed out that the current state of affairs in the management of solid waste in the city is grossly inadequate by international standards. The authors have pointed out that landfills are used as a predominant method of waste disposal in the city, and that there is a dire need for utilizing modern technologies of waste disposal and processing.

Taking such a realist view of conceptualization, this study thus discusses the causes and impacts of the waste management programmes of the city from the economic, social, political, technical, engineering and environmental perspectives. This integrative framework has the property of being inductive, interdisciplinary, people-based and therefore democratic with potential for success (York, 1988).

Landfills are used extensively by the city for dumping solid waste, and these landfills are not managed by using suitable and appropriate technology according to the

research work conducted by Nyman and Vorster. The treatment of landfills in major metropolitan municipalities often requires the use of advanced technology, as is shown by Silva, Dezotti, Sant'Anna Jr, Wiszniowski, Surmacz-Gorska, Robert and Weber (2004).

Unfortunately the country has not developed nor introduced modern waste technologies that will modernise the treatment of landfills. Such technological methods will require huge capital investments which the city might not have looking at the city's current capital budget. An alternative is to fund this much needed technological infrastructure through the privatisation of the waste service. Whilst this option is more practical and viable, it might marginalise the poor regions like region 01, 02, 05 and 07 since residents in those regions will not afford waste tariffs that have been priced commercially.

One of the key advantages of acquiring the latest technology also involves equipment that will gather waste data for the city to assist the city with planning and allocating the necessary resources based on the outcomes of the acquired data. According to Heeks (2002), although the Waste Information System (WIS) has the potential to dramatically improve efficiency in waste management, it was not being implemented due to lack of resources and suitable action plans of activities. It is a known fact that there is no proper integrated planning between different tiers of government and internally within the cities. Therefore developing an integrated waste management system can be one of the critical integration intervention that can assist national government to plan and monitor waste service across the country. Due to the current budget and capacity challenges to deliver waste service, investment in first (1st) world technologies can be seen as a luxury that the city or government at large cannot afford against the pressing current waste service demands. It is for this reason that modern technologies that must be procured like the waste management information system must demonstrate immediate benefits to the current waste challenges by creating jobs and skills development.

It is critical to emphasise that the management of waste is a complex and expensive exercise which must be handled by the state. The complexity of the service is also influenced by other factors like economic, cultural, engineering, management and political factors. This put in simple terms is that different communities, with different cultures, academic and economic status view waste differently (Seadon, 2006).

3.5 Challenges of Waste Management in the City of Tshwane

The implementation of waste management services in the city is experiencing a lot of challenges which amongst others include the following.

3.5.1 Institutional Arrangement

The City of Tshwane's Integrated Waste Management Plan has major staffing disparities within its Waste Management Department. These disparities adversely affect the waste management programmes in the city. The organograms below provide important insights into the structure of the departments associated with the waste management programmes.

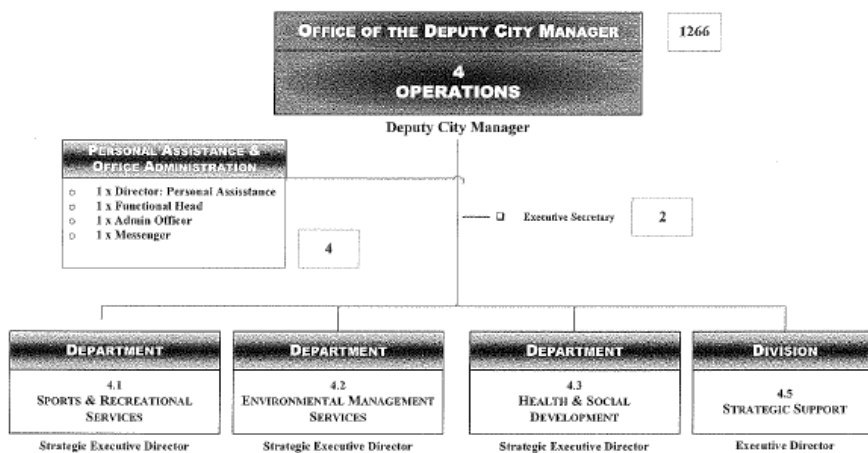


Figure 3: Macro Organisational Structure of the CoT (CoT 2010)

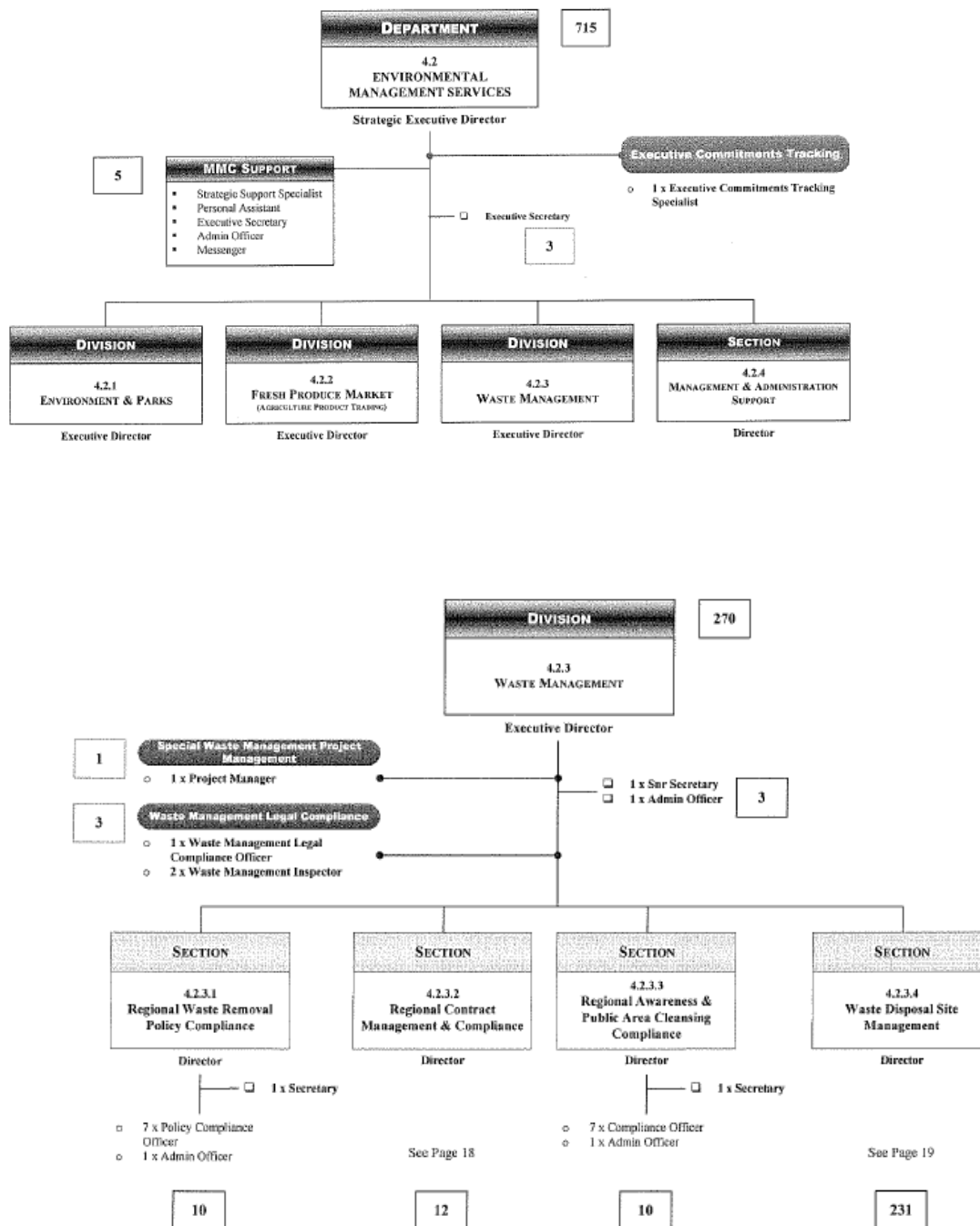


Figure 4 The organizational structure of the Environmental Management Department

The structure under figure 3 show that the waste management services is under the management of the Deputy City Manager: Operations. This shows that the city categorises waste as an operational function and not a strategic function.

Under figure 4 the structure shows that the waste service is a division instead of being a department given its complexity and importance. It is critical that such a function be given the necessary profile and capacity by having the function at a departmental level. This situation gives rise to a situation where the head of the department might not be an expert on waste management but specialises in horticulture services thus neglecting the key role of waste management. Furthermore, the division also finds itself competing with other divisions within the department such as parks, cemeteries and environmental management thus resulting in the division being under capacitated and resourced as demonstrated.

The waste management function in the city is seriously under capacitated and this is reflected in the poor performance of this function. Every effort should be made to correct the capacity deficiency in order to address the current service delivery challenges. As a result, there is a need to remodel the organisational structure of waste management both in the central office and in regions to be able to perform in the following KPAs of waste management:

- Collection and transportation;
- Waste disposal (including development and management of waste disposal facilities and transfer stations);
- Public Cleansing;
- Waste Minimization and recycling;
- Community liaison, education, awareness; and
- Regulation, information management and administration.

The city has to have appropriate capacity at both the central/ corporate office and the seven (7) Regional Offices (according to their responsibilities) in order to deliver the service in terms of these key performance areas. Establishing a separate and fully staffed waste management services business entity that will be focused on waste management will be a step in the right direction in addressing the current waste management services in the city.

3.5.2 The socio-economic factors in the waste management problem

Based on a study conducted in the Vidgaon village of India, economic factors such as the activities of big businesses and poverty among the masses and the massive influx of immigrants from rural to urban areas tend to constitute a major challenge to city councils in terms of maintaining environmental cleanliness and proper waste removal and disposal (Nimbalkar et al., 2009). Other studies focusing on India cities have reached similar conclusions (Rao, 2009).

It is common knowledge that businesses in both the formal and informal sectors in the city tend to generate waste as part of the unintended outcomes of their operations (Botchway et al, 2001). The rich and poor households also tend to interpret urban waste problems from different perspectives. The role of poverty in creating environmental degradation has been well argued by Martinez-Allier (1990). Economic conditions of people have significant impacts on the nature of waste management in urban centres (Hoyer, and Noess, 2008.).

The city is divided into seven planning regions which are based largely on the socio-economic conditions of the residents. Figure 5 provides some information on the population distribution in the regions.

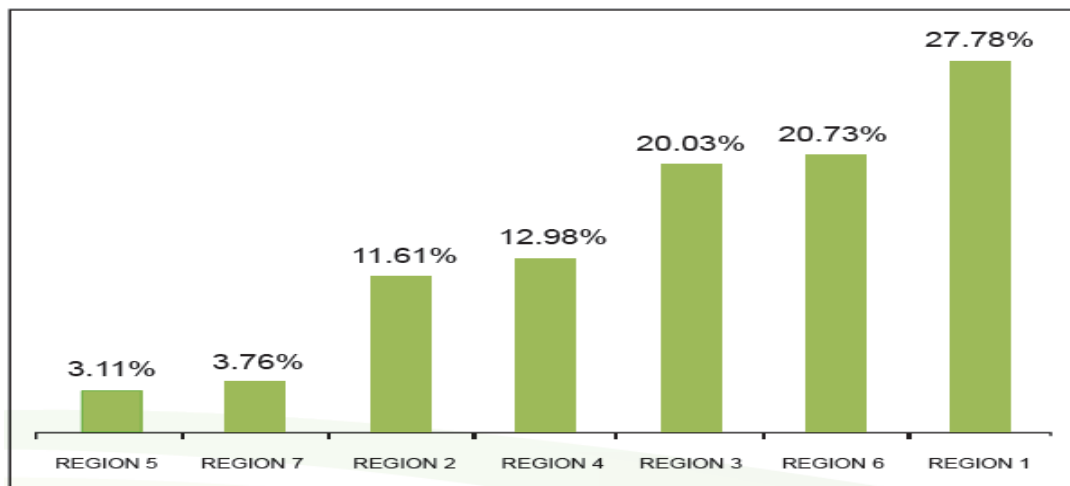


Figure 5: Tshwane population distribution by the planning regions

Source: (Stats SA Census 2011)

Figure 5 illustrates the population division per region in the city. According to this division, region 1, 2 5 and 7 account for 46.26% of the city's population which is almost half of the city's population. However the geographical spread and vast open lands in these regions makes it costly and logistically cumbersome to efficiently render waste services. Region 3, 4 and 6 are located in the urban and affluent parts of the city with densified spatial planning which makes it easier and cheaper to provide quality and consistent waste services. These regions also enjoy the historical legacy of the past racially segregated municipality's which were only providing proper services to white communities which were in these regions.

Annual reports produced by the city since April 2008 show that the businesses in the city generate tremendous amounts of waste. The problem emanates from both the formal and informal sectors. The annual reports have been conducted against the background of the failure to optimize the efficiency with which waste generated by businesses is managed in and around the City of Tshwane (CoT annual report 2015/16). The annual reports are conducted with a view to identifying and quantifying key factors that adversely affect efficiency in the management of municipal solid waste generated in the city.

The historical marginalisation of the historically disadvantaged areas of the city, namely region 01, 02 05 and 07 has given rise to the current socio economic challenges in these regions. The lack of proper waste infrastructure including the poverty levels of the communities in these regions is an apartheid legacy issue which might not be resolved overnight MacGranaham (1991) and Amis (1992). It is common cause that under investment on any service or activity will result in such service having a negative infrastructure backlog which will lead to the service being implemented to its expected levels like in the city (Hardoy *et.al* 2001).

Access to wealth is concentrated primarily in the southern and eastern areas of the cities, where access to basic services is good. In contrast, wards in the eastern and northern parts have access to some but not all services. Eighty-two per cent of all households have their rubbish removed by a local authority or private companies

whereas 3.3 per cent have no rubbish disposal services. A positive correlation tends to exist between a community's income and the amount of solid waste generated. Wealthier individuals, who consume more than people on lower income, generate a higher rate of waste.

The poor cannot pay taxes to contribute to the revenues needed to buy expensive equipment to address the waste problems in the city. In this connection, Tevera (1991) also cites urban solid waste disposal problems as indicative of poor revenue base, which is related to the inability of the poor urban households to generate enough incomes to be able to pay local taxes. Such situations adversely affect the ability of the municipal authorities to invest adequately in urban waste infrastructure and also adequately qualified engineers.

Access to services for the two erstwhile amalgamated municipalities into the city which form part of region 5 and 7 as reported by the Gauteng Treasury are provided in the table below (Gauteng Provincial Government, 2011).

Table 4: Household access to services

	% Of households with access to:	1996	2002	2009
City of Tshwane	Sanitation	78,7	76,4	81
	Water	91,7	90,9	89,4
	Electricity	79,9	82,4	78,7
	Refuse removal	81,3	83,4	81,3
Metsweding	Sanitation	66,5	69,2	72,5
	Water	79,3	88,8	84,9
	Electricity	66,9	72,2	57
	Refuse removal	52,7	55,8	64,6

(Source: Stats SA 2011)

Table 4 illustrates the provision of services to the then Metsweding municipality and the city during 1996 to 2009. It is clear that the provision of services in the Metsweding municipality which is now region 05 and 07 has always been low compared to that of the then City of Tshwane which was region 1, 2, 3 4 and 06. Refuse removal in the then City of Tshwane was always above 80% whilst in the then Metsweding area was always been 60% with the exception in 2009 where there was an improvement to 64%. These vast differences can be attributed to amongst others the historical legacy of the previous administration prior to 1994 whereby municipalities in previously white areas had all necessary waste infrastructure and systems.

Table 5 summarises the statistics for the City of Tshwane from the census data of 2011. According to the data in 2011 there is a recorded slight improvement on waste services from 1996, 2001 to 2011 in the City of Tshwane (City of Tshwane IDP, 2013).

Table 5: Percentage of households with access to waste removal services

	REMOVED BY LOCAL AUTHORITY / PRIVATE COMPANY			COMMUNAL / OWN REFUSE DUMP			NO RUBBISH DISPOSAL		
	1996	2001	2011	1996	2001	2011	1996	2001	2011
City of Tshwane	76,1	78,7	82,0	20,0	17,4	14,1	3,7	4,0	3,3
Gauteng	84,7	84,6	89,8	12,3	12,4	7,9	2,9	3,0	2,0

(Source: Stats SA 2011)

The statistics under table 5 demonstrate that whilst the city has recorded an improvement in delivering waste services through its service providers and staff, there are still areas without rubbish disposal. This situation creates a window of opportunity for the city to exploit the economic potential of the green economy through recycling and conversion of waste to gas initiatives. The economic sector of the city can have significant impacts on the quality of waste management in the city through creative interventions in both the formal and informal waste management sector. Poverty and unemployment motivates many impoverished families in developing countries to seek

remuneration through informal salvaging on landfill sites for items to reuse and scrap metal to sell to recyclers. Often this leads to the establishment of informal settlements near landfill sites and toxic dumps (Pantelic *et al.*, 2005; Naidoo, 2007).

We have seen this phenomenon at the city's heatherly landfill sites where the reclaimers have basically taken over the landfill and are resident in the adjacent informal settlement. The city cannot fight against this reality but rather formalise and control it for the benefit of both parties and future economic growth of the sector.

3.5.3 Cultural factors in the waste management system

Cultural practices and beliefs play a very important role on the outlook of a community in relation to their community. It is for this reason that government must always be conscious to cultural issues of its different communities when providing solutions to such communities. In a racially, religiously and culturally diverse country like South Africa it is always going to be wrong to provide a blanket approach to particular service delivery issues like waste services. Non-recognition of this cultural diversity has often resulted in lack of support and compliance from the communities (Roodt, 2001; Seadon, 2006; Herberlein, 1988).

The cultural practices and beliefs of communities are normally reflected on how they deal or react to issues. There are communities that do not have a problem with piles of rubbish in the streets and there are those that cannot tolerate waste in their neighbour hoods by introducing critical interventions to clean their areas (Martinez-Allier, 1990). Cultural factors, as drivers of attitudes and practices in waste management are examined in this study. Indeed, culture influences mind-sets and therefore interventions such as public education programmes are critical in waste management. Various actors can play a role in these interventions. For instance, owners of public transport systems such as taxis can be encouraged to install bags in their vehicles to prevent littering in the city's streets and other public places. Churches and other organizations can also be encouraged to educate their members about the

importance of proper waste disposal systems in residential areas and other urban spaces.

3.5.4 Political factors

Waste Management Services as a constitutional mandate of local government, and as one of those tangible municipal services, is often deployed as a political tool by various political parties. Local government is influenced by politics since every five years there are elections. This process naturally creates a contested space for political power for parties that aspire to govern in a particular municipal area. This political influence also flows from the national and provincial politics. We have observed during the local government elections campaigns how political parties emphasised the lack of service delivery to attack their opponents.

A general obstacle to the delivery of quality and consistent waste management service in developing countries is the high levels of illiteracy which prevents societies from knowing and understanding their legal rights and the service delivery levels that citizens are entitled to. Whilst the emphasis on housing, water and electricity is justifiable, it is equally important and a constitutional obligation for the City of Tshwane to deliver quality waste services to all its residents. The residents of the City of Tshwane are entitled to a clean and healthy environment as provided by the constitution of the country, therefore failure by the city to deliver on this constitutional mandate will constitute the violation of the constitution by the City of Tshwane. This is an important factor that all residents should be aware of and ensure that the city fulfils its mandate. . This lends to the argument that the public at large is therefore unaware of the prevailing 'human rights' and the relevant laws that exist for their protection and that of the natural environment, where waste services are definitely not an exclusion (Wall, 2000).

The allocation of resources that will go towards efficient and adequate waste management services in local authorities is highly dependent on the political will of the ruling party in that municipal authority. A consequence of varied priorities needs is that

political parties and public representatives might opt to prioritise what they perceive to be the immediate needs affecting local communities and ignore other issues like environmental management that might have long term catastrophic impacts. Whilst South Africa's constitution obliges local government to ensure that all communities are provided with basic services, it is always evident that from an operational point of view local authorities are struggling in this imperative due to lack of capacity and adequate resources. This often results in communities generating alternative ways of managing waste. A result in the mushrooming of illegal dumping site and the establishment of non-compliant landfill sites that become a health hazard for communities.

3.5.5 Engineering and related technical and environmental science issues

The city is still using the traditional methods of collecting and disposing waste at its landfills. This method is not only redundant but non-compliant with international protocols and waste legislation which discourages landfilling and encourages waste minimisation through the waste hierarchy (3R's). It is therefore critical that the city explores the re-engineering of its waste management methods and invest in the latest waste technology. Developed countries like Sweden have invested in such technologies and have managed to achieve 90% recycling and selling 10% of their waste to other countries.

Through the implementation of its IWMP the city can promote a positive culture on cleanliness and proper waste disposal by the communities. This can be achieved through progressive incentives provided by the city to incentivise community members who look after their environment and minimise their waste usage. (Liua, Shia, Qianc, Hud and Penge, 2011).

Establishing new landfills is becoming increasingly expensive and often unaffordable, because of the rapidly rising cost associated with land acquisition, construction and operation. It is evident that the city is left with no choice but to investigate and evaluate alternative, technological interventions to deal with the waste management issues as the available capacity of its existing landfills, thought to be able to meet the city's needs

for, at most, the next 10 years. Such technologies should provide alternative waste minimisation alternatives to mitigate the reality of diminishing landfill sites.

3.6. DISCUSSION

It is clear from the literature that has been reviewed that the city's waste management services model and policy require drastic interventions. The current conventional waste hierarchy, focused as it is on disposal via landfilling and/or incineration with a minimum effort of extracting value by recycling and/or energy recovery from waste, let alone activities to minimise the generation of waste at source, has compounded the city's waste management challenges. Ideally, this hierarchy should be turned upside-down with a strong emphasis on resource efficiency by means of reducing waste produced and recycling of used product and materials (SA Cities network 2014)

The challenges associated with waste management also provide economic development opportunities for the city (CoT IWMP 2014). It is encouraging to note that the Executive Council of the City of Tshwane has approved the establishment of a recycling plant for the municipality and this will contribute towards compliance with the provisions of the IWMP. This will also ensure that the city meets its objectives of being a "liveable" in accordance with its GDS 2055 vision statement.

The theoretical review of the city's strategic documents, policies and by-laws has demonstrated that there are efforts to align its policy and legal framework with international and local standards. However, due to limited resources and capacity it has become difficult to implement plans and enforce its regulatory framework. External influences as identified also impede the efficient delivery of waste management services. It is for this reason that the current proposal by the Waste Management Division of the city to convert this division into a municipal entity like Pikitup in the City of Joburg be supported. This will assist in ensuring that waste management services are delivered utilising an efficient business model. In theory this model might remove public services such as waste management from the traditional and conservative bureaucratic systems of government and expose them to creative and efficient private

sector model of service delivery. This can be achieved through a business-like approach to waste management service and appointment of qualified and competent waste practitioners.

Furthermore, there is always a threat of commodifying a constitutional service like waste management if outsourced or privatised. Financing is fundamental to the collection of waste and it should be more cost effective for the public sector (city) to collect waste, however it is evident from a number of papers (Freeman and Mgingqizana, 2002; Wehenpohl and Kolb, 2007) that budget prices provided by private operators are more often not cost effective due to corrupt practices into the process, (Liebenberg, 2007). Nevertheless, if properly managed and monitored outsourcing the waste management service can have efficient and consistent outcomes.

It is becoming increasingly evident that the city must leverage on the current socio-economic challenges of its communities by formalising the reclaimers as outlined in its IWMP. This would result in a system where reclaimers perform functions on behalf of the municipality at lower cost whilst at the same time earning a living and reducing current high unemployment. Furthermore, the involvement of the broader community in the collection of waste can have a huge impact on the reduction of fleet management costs of the city. The city can encourage the community to collect recyclable waste and deliver to various recycling sites from where community members can be given food vouchers that will be redeemable at various local outlets.

Waste disposal is a municipal service that should be afforded to every citizen, while ensuring its comprehensive management to alleviate environmental hazards and promoting anthropogenic safety (Reddy, 2007). This will encourage the community to get involved in the waste management efforts of the city and will lead to poverty reduction and low expenditure cost to the city's waste management service.

The heterogeneous profile of the city poses planning and resources allocation challenges in the efficient delivery of waste management services. However, it is surprising to note that the city's IWMP does not set specific plans per region to ensure

that particular attention and resources are allocated to a particular region due to its socio economic or geographical circumstances. According to the city' IWMP's gap analysis the previously disadvantaged regions remain under resourced and serviced compared to region 3, 4 and 6 which have been historically well resourced and is still over resourced. These disparities will continue to have a negative impact on the delivery of waste management services since resources play a significant role in the implementation of municipal policies and strategies. This also relates to the enforcement of by-laws in the disadvantaged regions of the city(CoT IWMP (014).

Beyond resource allocation, the city has not moved with speed in the implementation of its waste recycling programmes despite the fact that the Executive Council resolved in 2014 to establish a recycling depot. However, it must be noted that income from recycling is uncertain and dependent upon material and manufacturing markets. The estimated income that could be generated from the sale of recyclables for the 'Zero Waste' project in Durban could not cover the monthly costs of running the project Matete and Trois, (2008). Such initiatives will contribute significantly to the reduction in waste conversion to landfill and also stimulate economic development particularly in the informal sector. Other initiatives like waste to energy present opportunities to use waste as part of the solution to the current electricity challenges of the country.

The next chapter will provide insights into the underlying causes of City of Tshwane waste management challenges.

3.7. CONCLUSION

This chapter examined key issues to be addressed in my study on the waste management challenges of the City of Tshwane. It has provided a focus on the scope of the study and the justification.

The scope of this study is based on a review of the pertinent theory which led to the identification of five factors that are relevant in understanding the processes

influencing the successes and failures of the current strategies in place to manage waste in the city.

The City of Tshwane regions selected for the purposes of this study will be on regions 1, 2, 5 and 7 given the serious waste management challenges in these areas. The four regions are selected to test the hypothesis of this study as related to the influences on the waste management sector of the economic, cultural, political, public management and engineering factors discussed above.

Information was collected from municipality officials on waste management in the city. The details of the methodology used to collect and analyse information to address the objectives of this study are discussed in the next chapter on Research Methodology.

By linking this study to some theories in the literature, five key issues have emerged whose validity is tested empirically. The study will thus help to illustrate how inductive or concrete research can be related to theory to produce research information which can be relevant in practical terms.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This chapter provides a description of the study area, research design and methodology selected for this study. It begins with the theoretical basis of the qualitative methodology and follows with a description of the design of the study, including the procedures applied during observation, document analysis and the interviewing of informants, data collection as well as the validity and reliability of this research.

In this study, the researcher used structured questionnaires and personal interviews for data collection. Both structured questionnaires and personal interviews have their advantages and disadvantages. Personal interviews allowed the researcher to gather data rapidly, thereby cutting down the cost and time of study. Moreover, personal interviews enabled the researcher to elaborate on unclear or difficult questions and to also probe the respondents. In some instances, respondents tended to respond quicker to questions or questionnaires instead of responding to the questionnaire electronically.

The variables of study used in this study involved nominal variables such as gender (male and female) as well as ordinal variables such as the extent to which lack of waste services had on the community and municipality. Order does not matter in nominal scales, whereas order matters in ordinal scales. The list of variables of study consisted of well-established indicators of proper waste disposal and awareness about the benefits of proper sanitation and personal hygiene. The variables of study also included socio-economic and demographic characteristics that are directly related to the type and volume of waste generated by the various study regions, efficiency in the collection and disposal of waste, awareness about the benefits of cleanliness, proper waste disposal, personal hygiene and overall environmental sanitation.

The methods of data gathering and analysis used in this study were qualitative due to the nature of the study and the research questions that needed to be answered as part

of the study. Furthermore personal face to face interviews allowed the researcher to get first-hand experience of the respondent's frustrations or achievements through observing their body language, facial expressions and environment. The extent to which the researcher used qualitative research methods of data collection and analysis were quite limited. The responses that the researcher managed to obtain from each questionnaire of study were verified and the data was validated prior to data analysis and the interpretation of results.

The researcher ensured that due consideration was made to all relevant ethical principles and followed all standard ethical principles in the process of data collection. All participants in the study were adequately informed about the purpose and potential benefits of the study, and took part in the study voluntarily.

4.2 STUDY REGION

The City of Tshwane was officially established in December 2000, made of the amalgamation of 13 former city and town councils. In 2007, the city approved a plan to implement a service delivery model which was based on 5 planning regions. This number has been increased to 7 planning regions today after the incorporation of the erstwhile Nokeng and Kungwini Municipalities. City of Tshwane Socio Economic Review. (2011). Under the current political dispensation in South Africa, Pretoria is administered by the City of Tshwane (CoT).

The racial makeup of the population according the Statistics South Africa 2011 Census appears below:

Table 6: Racial composition Census 2011

Race Groups	Figures
Black African	2.2 million (75%)
Whites	586,000 (20%)
Coloureds	59,000 (2%)
Indians	54, 000 (1.8%)
Others	19,000 (0.6)

The above illustration demonstrate the racial makeup of the city which also informs the regions of the city. The black African population, Indian and coloureds is largely residing in region 1, 2 5, 6 and 7. The white population of the city is accommodated in region 3 and 4 which were previously the City Council of Pretoria and Verwoerdburg Council during the racially structured councils. This legacy partly gives rise to the current waste backlogs due to the fact that the other five regions did not get the necessary and quality waste service during the apartheid era. The current government is facing a huge task of redressing the imbalances of the past whilst at the same time dealing with the ever increasing population due to influx of migrants in the city and the diminishing landscape for the creation of landfills. This necessitates the implementation of the waste hierarchy to encourage the waste minimisation in order to avoid using landfills.

Please see below a summary of the townships and suburbs that make up the four (04) study regions.

Region 1 (North West): Mabopane station urban Core, Soshanguve Winterveldt, Theresa Park, Nina Park, Amandasig, Karen Park, Akasia metro core, Pretoria North CBD area, Rosslyn / Ga-Rankuwa, The orchards, Kopanong, klipkruisfontein, Hebron.

Region 2: (North); Wonderboom Airport, Babelegi Industrial Area, Wonderboom Nature reserve, Tswaing Crater Nature Reserve, Dinoken Nature Reserve, Hammanskraal, Temba, Montana, Annlin, Dooringpoort, Sinoville, Onderspoort, Stinkwater, Diloppe, Suurman, Mojaneng, Mashemong, Walmannsthat agricultural holdings,

Region 5 (Nokeng) Cullinan, Dinoken Game reserve and Rodeplaat Dam.

Region 7 (Kungwini) Brhonkorspruit, Ekadustria, Zithobeni, Ekangala/ Rethabiseng.

4.3 RESEARCH DESIGN AND METHODOLOGY

A qualitative research design was adopted for this study. The research design is a plan or blueprint of how you intend conducting the research. Mouton, (2001). The collection of data was undertaken through questionnaires and interviews. Information from the interviews and questionnaires was used to generate primary data for the study.

4.3.1 Research Design

This study made use of qualitative research which refers to non-numeric data measurement by survey approach. The design indicates which individuals will be studied and when, where and under which circumstances they will be studied. McMillan and Schumacher, (1993).

Data was generated through interviews with relevant city officials in the Environmental Management Department and city's regional offices. Responses from questionnaires' surveys and interviews were used to generate primary data required for the study as traditionally executed in related studies Henry et al, (2006); Ayininuiola and Muibi, (2008); Suttibak and Nitivattanon, (2008); Alavi Mogadham et al, (2009); Farzadkia et al, (2011).

This study analyses the implementation of waste management services in the city's historically disadvantaged areas which are located in region 1, 2 5 and 7. The study identified the underlying reasons for the challenges faced by the city in implementation waste management services. In order to investigate these factors, convenient and purposive sampling of officials was conducted to gather data that would assist in identifying the underlying sources of the waste management challenges of the city. Huysamen (1993) defines a case study as a system which pertains to the fact that a limited number of units of analysis such as individuals are studied intensively.

The case study was chosen because of the limited time available to conduct the study and utilising the case method also reducing costs in terms of travelling.

4.3.2 Qualitative Research

The research approach selected is the qualitative research due to its effective description of social problems. It is an approach that is not conclusive but seeks to explain the social phenomena, Denzin, (2000). Qualitative research uses four methods for collecting data, namely participation in the setting, direct observation, in-depth interviews and analysis of responses. This is helpful in understanding behavioural patterns and has meaningful understanding of the data that will be analysed and interpreted. During the interviews the researcher managed to gather more information through observations and probing beyond the responses to the interview questionnaire.

4.3.3 Research Setting

The study was conducted through a qualitative research design that was based on the following methods. Such methods were chosen to enable the research to collect adequate data in an efficient and accurate way.

4.3.3.1 Sampling method

Sampling is deployed “because it is impractical to cover the entire population” Kannae, (2004). The purposive sampling and convenient sampling methods were used for this study. The purposive sampling method was organized on the basis of the regions of the city and the fact that city officials are responsible for the delivery of waste management service delivery. City officials were contacted to arrange interviews. Communication was through telephone calls, emails and meetings. Convenient sampling method was used in this regard due to the researchers close proximity to most of the sampled respondents which enabled the researcher to have interviews with some of the respondents after hours or during weekends due to their tight schedules during working hours.

4.3.3.2 Purposive Sampling

In this research purposive sampling was also applied. De Vos (2005) states that purposive sampling uses the judgement of the researcher to select cases. This means that cases were selected with the specific purpose of getting the views from different stakeholders.

Purposive sampling was relevant in consciously selecting officials from the city who are involved in the waste management service delivery matters of the city. This method of sampling provided the researcher with the justification to make generalisations from the sample that being studied, whether such generalisations are theoretical, analytic and/or logical in nature. The following data collection method was applied within this sampling under the following topic.

4.3.3.3 Convenient Sampling

Convenience or opportunity sampling is the most common type of sampling in studies where the only criterion according to Dörnyei (2007) is the convenience of the researcher.

The researcher used this method of research due to the fact that as a full time employee and part time student it was only practical for the researcher to undertake the research and meet with the sampled respondent at a convenient time of the respondent and the researcher. This could be achieved because some of the respondents reside in close proximity to the residence of the researcher and the researcher could arrange meetings with respondents after hours and over weekends. Furthermore due to the fact that the researcher is a former employee of the city and has close relations with some of the respondents it was easy to arrange meetings with these respondents. This allowed for the attainment of results within a flexible framework that did not inconvenience arrangements with the respondents.

In order to have an equitable number of respondents per region the following number of respondents per region;

Table 7: Number of respondents per region

Region	Number of respondents
Region 1:	3
Region 2:	3
Region: 5:	3
Region:7	3
Head office	3

Respondents were representative of all local race and gender groups and were at least over 18 years old. All respondents were briefed in advance about the study and what it entailed. They were also briefed about their rights and assured that their identities would be kept secret. Respondents were also assured that they could withdraw from the study. Basic demographic information such as age and education was elicited from participants. The interview schedule was 30 minutes and the participants were asked questions related to the implementation of waste management services in their respective city regions and area of speciality on waste management.

The questionnaire that was used to interview the participants was divided into two categories, namely the demographic category and interview questions category. The following questions were asked on the questionnaire:

- What are the challenges experienced by the city in providing waste management services and policies?
- How do the challenges affect the provision of waste management service delivery?

- What is the role of other structures such as communities and organisations in providing waste management services?
- How can other structures such as communities and organisations work with the city to improve waste management services delivery?
- Do you think that the required institutional capacity is available in the city to provide waste management services? Please explain?
- Do you think that the city has enough infrastructures to deal with waste management challenges? Why?
- What are the mechanisms that can be put in place to address the basic service delivery challenges with regards to waste management in the city?
- In your opinion, has the city done enough to eradicate the past imbalances in the provision of basic services such as waste management? Please explain your answer.

Information was collected from these 4 areas of the city and the waste management head office through face-to-face interviews based on samples of the city officials associated with the service delivery sector. In addition, mailed questionnaires, observations and other instruments were used where necessary to obtain the information needed for this study Mouton, (1996).

4.3.4. Research Methodology

Mouton (1996) describes methodology as the means or methods of doing something. The study was conducted using methods that include semi-structured interviews, document analysis, observations and case studies. The method used in the study integrated other methods to achieve the research outcome that will be relevant and responsive to the research questions Henning (2004).

The collection of data for the study was done through a descriptive survey method which entail asking questions to a group. The researcher managed to have group meetings with respondents to gather data on the subject matter. This process assisted the researcher in observing the different and same responses from the different respondents.

The research process that was undertaken to collect the data is outlined in the next sections.

4.3.4.1 Interviews

There are three types of interviews as identified by De Vos (2005) namely, semi-structured, unstructured one –on-one and ethnographic interviews. The researcher chose to use semi-structured interviews because most of the respondents, particularly the regional executive directors required more flexibility since they are not experts on the specific waste management issues but manage the regions where these services are rendered. They have a view and experience of the challenges at a high level, hence it was critical to ensure that the interviews were semi structured to allow the flexibility on the questions and responses. The critical benefits of semi structured interviews is that they encourage the researcher to bring his experiences and lessons to the process and interrogate the responses provided by the respondents Bless (1995).

The interviews were normally started with a synoptic explanation on the purpose of the project and emphasizing the importance of keeping the research information confidential as prescribed by the ethical policy of the university. Gubrium and Holstein, (2002). To ensure convenience and efficiency the researcher conducted interviews with the respondents at their homes, offices and restaurants given their hectic work schedules. This proved to be helpful and was consistent with the semi structured interview approach adopted for this study and it proved to be useful in getting the maximum participation of the respondents.

To ensure that the interviews were focused on the subject matter, an interview schedule was administered and responses manually recorded. Some respondents completed the schedule through emails whilst those who were not comfortable to write gave verbal responses to the questions. This allowed for close engagement with the respondents and provided the researcher with an opportunity to clarify responses and allow for further elaborations from respondents.

It is important to highlight the fact that interviews have advantages and disadvantages. The advantages related to interviews is that they create an intimate interaction with the respondents, encourage probing, generating huge volumes of data in a short period, immediate clarity and responses, observation of facial expression and body language. Goode and Hatt (1952). However on the other hand interviews can have their disadvantages since they allow respondents to respond to their own frame of reference Bogdan & Knop Biklen, (2003). Sometimes the researcher can be emotionally involved depending on the research topic which might compromise the quality of data due to researcher bias. To mitigate these disadvantages the researcher refrained from providing a frame of reference for the respondents, created a relationship of trusts with respondents, conducted the interviews during the respondents preferred time and venue, related to the respondents as a former colleague and most importantly demonstrated the necessary credibility as an ethical student and colleague.

4.3.4.2 Observation

According to McMillan and Schumacher (1993:256), the term “observation” is used to describe the data that is collected regardless of the techniques that are employed in the study. The observation method employed by the researcher in the study was the non participatory observation method. This method was used because the researcher did not want to participate in the research or avoided interviewer bias because of his understanding of internal capacity and resource challenges.

(a) Non-Participatory Observation

Walliman (2006) states that observation is a method of recording conditions, events and activities through non-inquisitorial involvement of the researcher.

The researcher attended the department meetings as an observer. According to the discussions and agenda of the meeting the purpose of the meeting was to provide an update on the implementation of the department's strategic and operational action plans. At this meeting the waste management officials gave progress reports on their action plans and also identified areas that required intervention. Whilst the observation made was that of a team that is committed and dedicated to delivering efficient waste management services, frustrations with issues that related to lack of cooperation from communities and lack of operational and capital funding were observed.

4.4 LITERATURE REVIEW

A literature review is an objective, thorough summary and critical analysis of the relevant available research and non –research literature on the topic being studied (Hart, 1998). In order to gather more data on the subject matter the researcher reviewed waste management journals to identify case studies on waste management solutions in other cities. Beyond journals, government reports like the city's annual report for the 2016/17 financial year to understand and comprehend the service delivery performance of the city in general and its waste management services in particular. The Stats SA report for the city was also studied to gather specific statistical information on the waste management services performance against other metropolitan municipalities.

4.5 DATA PRESENTATION

Data analysis is the process of “making sense and meaning from the data that constitute the finding of the study” Merriam, (1998,).

The data obtained from the interview schedule was transformed into quantitative information by means of coding. Coding of the raw data enabled the generation of

statistics while at the same instance allowing for the same data to be analysed qualitatively.

Without continuous analysis, the data can be unfocused, repetitive and overwhelming. To ensure proper interpretation and consistency of the data the researcher read and verified the responses repeatedly to identify recurring trends on the responses. Merriam (1998) indicates that, “analysis usually results in the identification of recurring patterns that cut through the data or into the delineation of a process.” The researcher read the interviews repeatedly to gain a sense of the whole picture and to facilitate the interpretation of smaller units of data. Text segments were compared and contrasted to identify context bearing data segments, and the naming and classification of categories McMillan & Schumacher, (2001). The use of the inductive process helped the researcher to determine links between the categories to form tentative hypotheses that led to the development of theory Merriam, (1998). Furthermore, the researcher double-checked the data which allowed for refining the analysis and interpretations to ensure validity and reliability.

The researcher also analysed the researched data inductively to allow categories and patterns to emerge from the data leading to sets of smaller and similar data that are more workable. This comparative method helped the researcher to compare one unit of information with another to look for recurring regularities and patterns in the data so as to segment the information into categories.

4.5.1 Coding of Data

The collected data is coded utilizing symbols for each type of variable. The coding process is arranged according to symbols for each category and the coding was done after the field work.

4.5.2 Data Entry

The collected data was processed through the creation of a data file in which the data was entered into a file. The file is divided into columns and rows. Then the data was cleaned, which involved running preliminary frequencies of all the variables in order to make sure that variable names and response categories/values are correct and valid. The data was manually recorded during the interviews and no recording machine was used. Data collection and procedural data analysis occur because the researcher is continuously engaged with the data as it is collected Kerlinger, (2002).

4.5.3 Document Analysis

Data sources can be divided into primary and secondary sources. The Primary data is data collected with the primary purpose of answering the research question posed by the researcher and gathering first hand data from respondents. Secondary data is data used in a study, although collected by a different researcher for the purpose of addressing a different research problem (Babbie et al, 2001). Data was also collected from waste management journals and government reports. This data was used to factually assess the performance of the city against other metropolitan municipalities. Furthermore data from the city's annual reports gave statistical performance of the city's waste management services in the study regions against other regions. This method of data collection augmented the primary qualitative research method employed by the researcher.

4.6 ETHICAL CONSIDERATIONS

Respondents were informed about the purpose of study along with their right not to participate or to withdraw at any juncture in the study. Each participant took part in the study willingly and there were no objections. Participants of the study were informed that their responses to questions were confidential. Researchers need to adhere to the ethical values when conducting research and at all times the researcher complied with this ethical principle Hinckly, (2005); Mare der Westhuizen, (2007). Full explanation was provided to each respondent in the study. Respondents were provided with the letter of introduction written by the supervisor of study before they

were interviewed. A letter from the City of Tshwane granting permission to interview their officials was also obtained and presented to respondents before the interview.

4.7 CONCLUSION

Data collection methods including survey questionnaires, interviews, and observations were discussed in this chapter. The advantages and disadvantages of each method were also explained. The data were collected from city officials in the waste management division and regional service delivery region in region 01, 02, 05 and 07. These respondents are part of the senior management of the city and are entrusted with the responsibility of delivering the waste management service. These respondents formed part of this research process and it is only appropriate that in conclusion it is recorded how this data collection process was facilitated and implemented by the researcher.

It is critical to present the process of collecting, processing and analyzing data in order to arrive at the findings of the study. Such a process demonstrates the research methodology and research design that the researcher followed. Explanation on the reasons for each research process is important since it illustrates the reasons why the researcher chose a particular research method as opposed to others. This gives credibility to the quality and correctness of the data. Furthermore, ethical considerations and observations are also important processes of the study to ensure the ethical integrity of the research.

The collected data from the respondents as it was analyzed started to produce consistent similarities on the issues from the study regions and this became increasingly evident after the data analysis process.

CHAPTER 5: DATA PRESENTATION AND INTERPRETATION

5.1 INTRODUCTION

This chapter provides an analysis of the collected data from the identified samples. The collected data from the respondents i.e. City of Tshwane officials, is analysed based on the semi structured interview questionnaire. The responses to the questions will expose the underlying sources of the waste management challenges of the city. The chapter is divided according to the following sections:

- Data Presentation
- Data Analysis
- Presentation, Interpretation of data from the interviews and document analysis

5.2 DATA PRESENTATION

The main purpose of the research was to investigate the implementation of waste management services in the City of Tshwane.

In this case, the researcher studied the phenomenon of waste management challenges in the city with the aim of finding out if such services are delivered according to legislative obligations and international protocols. Furthermore, the study set out to establish the significance of the city's policies and strategies to improve and enhance waste management services. All the aims and objectives are covered in this presentation of data from the various respondents interviewed.

The data was collected using the structured questions below and were directed to the following respondents: the City of Tshwane Officials at senior management level of the head offices and the regional managers in region 1, 2, 5 and 07. The questions were formulated from the objectives as indicated in Chapter 1. The major research questions of the research were:

What are the challenges experienced by the city in providing waste management services and policies?

How do the challenges affect the provision of waste management service delivery?

What is the role of other structures such as communities and organisations in providing waste management services?

How can other structures such as communities and organisations work with the city to improve waste management services delivery?

Do you think that the required institutional capacity is available in the city to provide waste management services? Please explain?

Do you think that the city has enough infrastructures to deal with waste management challenges? Why?

What are the mechanisms that can be put in place to address the basic service delivery challenges with regards to waste management in the city?

In your opinion, has the city done enough to eradicate the past imbalances in the provision of basic services such as waste management? Please explain your answer.

An attempt was made to examine the literature review which had some direct relevance to some of the questions which were addressed to the city officials. This related to staffing challenges, socio economic challenges of the different regions and legislative framework governing the waste management sector. It should be noted that by using literature review some questions in the research were answered.

5.3 DATA ANALYSIS

The data was analysed to establish whether the provision of waste management services is provided in accordance with the Constitutional obligations of the city and against International standards. Below is an analysis of data based on the questions which were asked to the respondents.

The total number of respondents that were sampled were fifteen (15) and these respondents were drawn from Regional Executive Directors, Directors, Deputy Directors and Functional Heads as outlined under table 9.

Table 8: Management respondents

Position	Region 01	Region 02	Region 05	Region 07	Head Office
Head Of Department	0	0	0	0	0
Executive Director	0	0	0	0	1
Regional Executive Director	1	1	1	1	0
Director	1	1	1	1	1
Deputy Director	1	0	0	0	1
Functional Head	0	1	1	1	

5.3.1 Demographic Information

This section of the study is intended to share the demographic information relating to the sampled respondents. During the interviews the respondents were asked to share their gender, designations, work experience in the city and race. It must be noted that

beyond the structured interview questions, respondents were also asked to share their highest levels of education and age. Whilst 08 respondents were willing to share their age, 07 female respondents were not comfortable sharing their age. Furthermore 05 respondents were also not willing to share their qualifications. Figure 5.3.2. Below will illustrate the responses from the respondents on the above;



Figure 6: Work experience

According to figure 6 Fourteen (14) of the respondents have work experience in the city of more than 05 years whilst only one respondent has less than 05 years working experience. This demonstrate that the majority of the respondents have adequate experience and their input or contribution to the study will be of significant value.

5.3.1.1 Gender

The interview questionnaire also required the respondents to provide their gender. The gender representation of the respondents was that eight (08) of the fifteen (15) respondents were female whilst seven (07) respondents were males. The gender information is provided below;

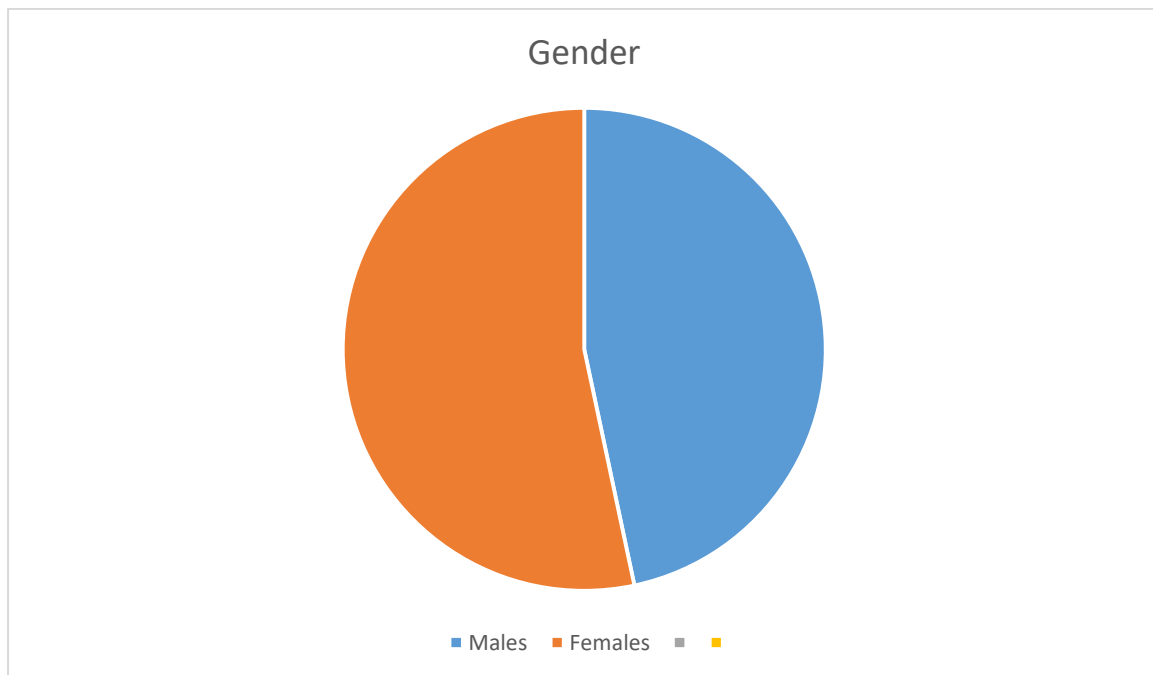


Figure 7: Gender

The results under figure 8 Indicate that 53% (08) of the fifteen (15) respondents were female and 47% (7) were male. This gender profiling is necessary to observe and demonstrate the transformation efforts of the City of Tshwane within the Waste Management Sector in particular and efforts to empower women in general.

5.3.1.2 Highest Qualification Attained

It is important to note that this information was attained through interviews and was not included in the interview questionnaire.

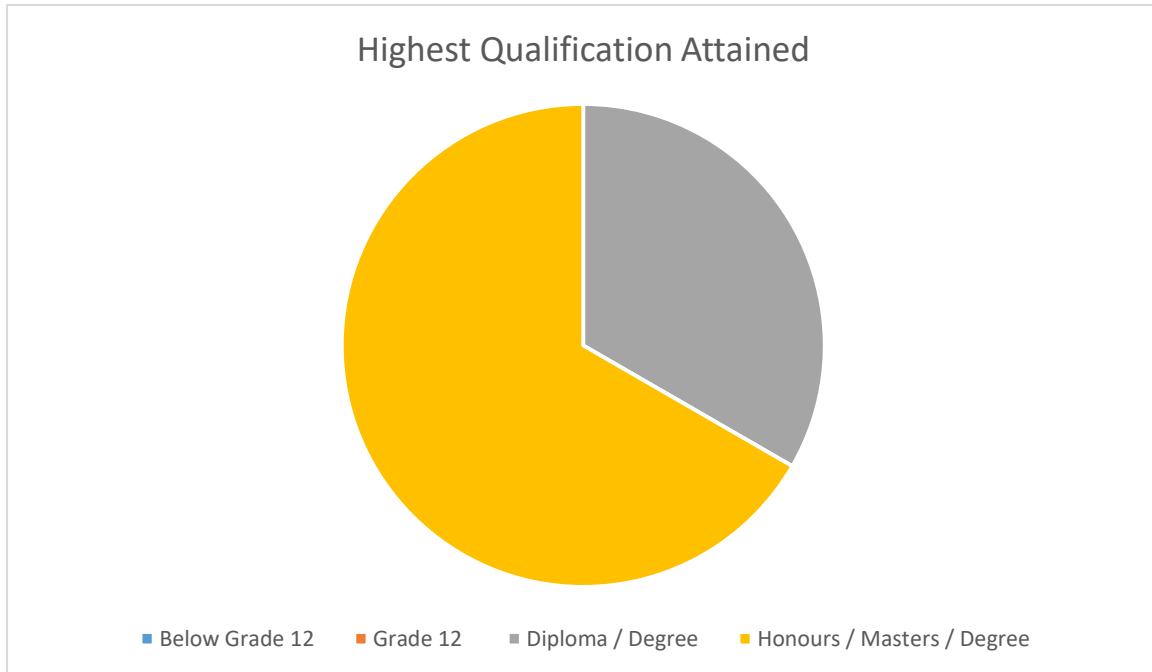


Figure 8: Level of education

According to figure 9, 33% (05) of the respondents possessed Diploma / Degrees whilst 67% (10) of the respondents all possessed post graduate degrees in Honours and Masters. This information demonstrates that the respondents are highly qualified and will provide informed input on the research.

In order to prepare for the data analysis the questions that were asked to the respondents were prepared in advance and organised in a manner that is consistent with the objectives of this research. The analysis is presented in a way that the purpose of asking each question is provided. The following provides the findings as per the set of questions asked.

5.4. PRESENTATION OF FINDINGS IN TERMS OF THE RESPONSES FROM THE INTERVIEWS

To ensure consistency and structured interviews the same set of questions were asked to all respondents during the face to face interviews. The findings and interpretation of all questions can be seen below:

5.4.1 What are the challenges experienced by the city in the delivery of waste management services?

This question was asked to the respondents in order to understand the challenges experienced by the municipality in the delivery of waste management services.

From the 15 respondents all identified the insufficient budget, staff, lack of capacity, lack of by-law enforcement and complex institutional arrangements as the main challenges experienced by the municipality in the delivery of waste management.

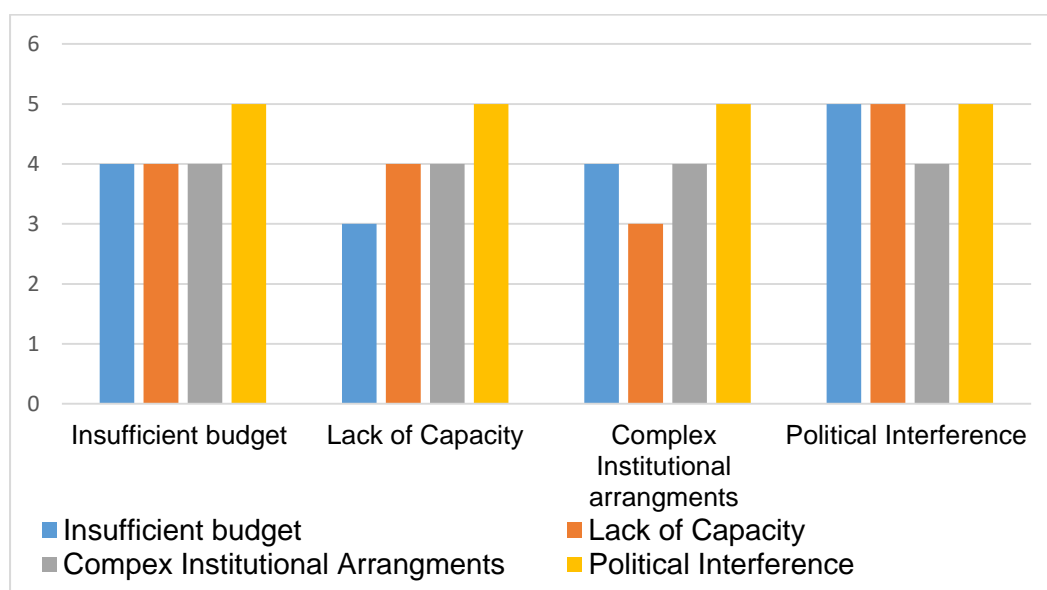


Figure 9: Challenges of rendering Waste Management Services in the City of Tshwane

According to (Godfrey, 2007) funds that are allocated by government for waste management service provision are generally extremely limited. This leads to a lack of capacity within government and (to a lesser extent) within the private sector, which is often subcontracted to provide this service. Waste management inherently demands high resources with low returns on investment (Godfrey, 2007). It is clear that the identified challenges are synonymous with funding of waste management services in all spheres of government and private sector.

Lack of adequate waste management funding for the city and other municipalities is a chronic challenge which impacts negatively on long term planning, policy and legislation formulation and resources (DEAT, 2000). It is a universally accepted reality that the expectations of the public will always exceed the resources of government. It is for this reason that creative and efficient methods of service delivery, particularly waste services should be identified to deliver more with less (Fozzard, 2001; Kramer, 1979).

However, in addition to the above, other respondents also cited political interference as another critical challenge experienced by the municipality. This related to the appointment of EPWP workers for cleaning campaigns. This process is normally managed politically and ultimately does not achieve its intended objectives. Quoting one of the respondents ***“EPWP is used for political benefit contrary to its primary purpose of providing the residents of the city with temporary job and training opportunities”***

Political allegiance could also affect the distribution of resources. Often resources are allocated in a biased manner. It has also been identified that city authorities tend to allocate the limited financial resources to the affluent communities (higher tax payers) where citizens with more political pressure reside (Rushbrook & Pugh, 1999). Such cases promote unethical and unequal distribution of resources, which is anti-democratic

The respondents emphasised that lack of funding, capacity, by-law enforcement and political interference feature prominently on the challenges experienced by the city in delivering the waste management services. It is therefore critical that to address these challenge the city must seek to realign its budget revenue and expenditure with its waste management obligations. Furthermore, the city should depoliticise the waste management service through the establishment of an entity that will manage this service on behalf of the city. It must be recorded that the city has embarked on such a process as provided by Section 78 of the Municipal Systems Act of 2000. It is envisaged that the de-politicisation of the waste management service will also ensure

that qualified and competent waste management officials with the necessary experience and capacity will be appointed to capacitate the city's waste management department and improve its service delivery record.

It is important to emphasise the fact that whilst it is critical for the city to capacitate and fund the waste management division that will not simply improve service delivery. Throwing money and staff at service delivery challenges without proper short, medium and long term plans and strategies that are relevant to the circumstances of the different communities of city will not solve the current waste challenges of the city (Berger, 2007). This means that beyond allocating the required resources for the waste service, the city must involve the community, appoint competent staff who will develop and implement practical waste plans for the city that will seek to achieve the waste targets of the city and create a clean and healthy environment.

It is therefore not desirable but necessary for the city to establish a municipal waste management company or entity through Section 78 of the Municipal Systems Act to ensure that a proper institutional model is executed with the appropriate funding and staffing solutions.

5.4.2 How do the challenges affect the provision of waste management service delivery?

08 respondents commonly agreed that the challenges result in service delivery protests, high expenditure on overtime and creation of illegal dumping sites in the communities.

The other respondents whilst agreeing with the above responses also highlighted the fact that the city is also not meeting its legislative obligations and Polokwane declaration because of the identified challenges. One respondent quoted in his words indicated that ***"The city is no way near complying with the Polokwane declaration"***. This is an unfortunate situation considering the status of the city a capital and one of the big metropolitan municipalities.

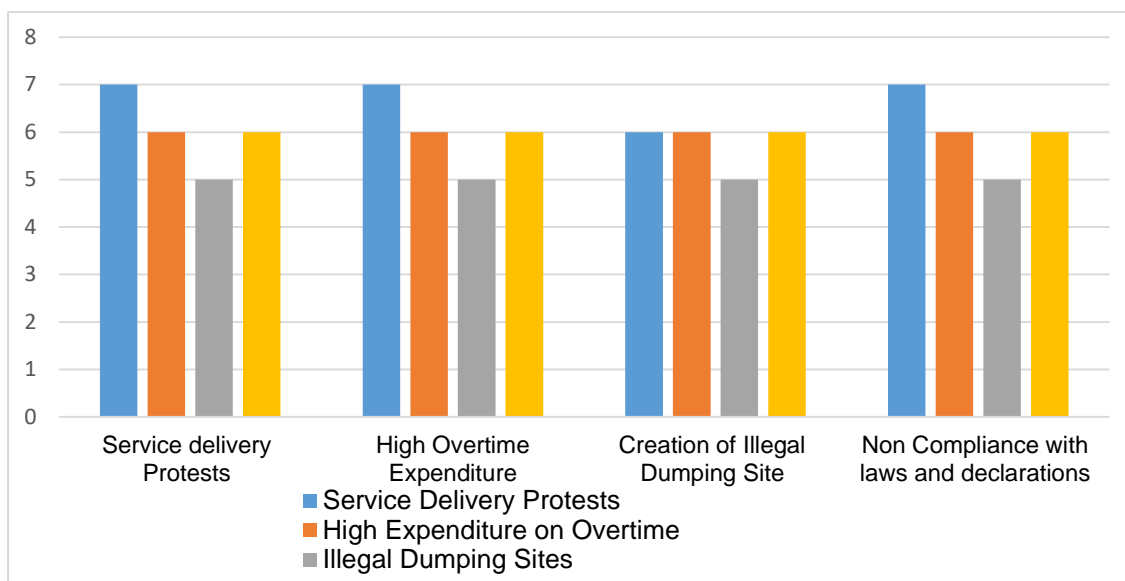


Figure 10: Implications of the Waste Services challenges

From the responses it was clear that all indicated operational challenges of the City of Tshwane had a huge impact role on its non-compliance with its constitutional obligation to provide waste services to all its communities and in accordance with international and local waste management protocols. It is common cause to note that the improved operational efficiencies of the department will automatically result in the city complying with the constitution and international protocols.

5.4.3 What is the role of other structures such as communities and organisations in providing waste management services?

All 15 respondents emphasised the fact that waste management services is the responsibility of the city. Therefore, whilst community and other private structure involvement is encouraged the city should be in the forefront of waste management processes and delivery.

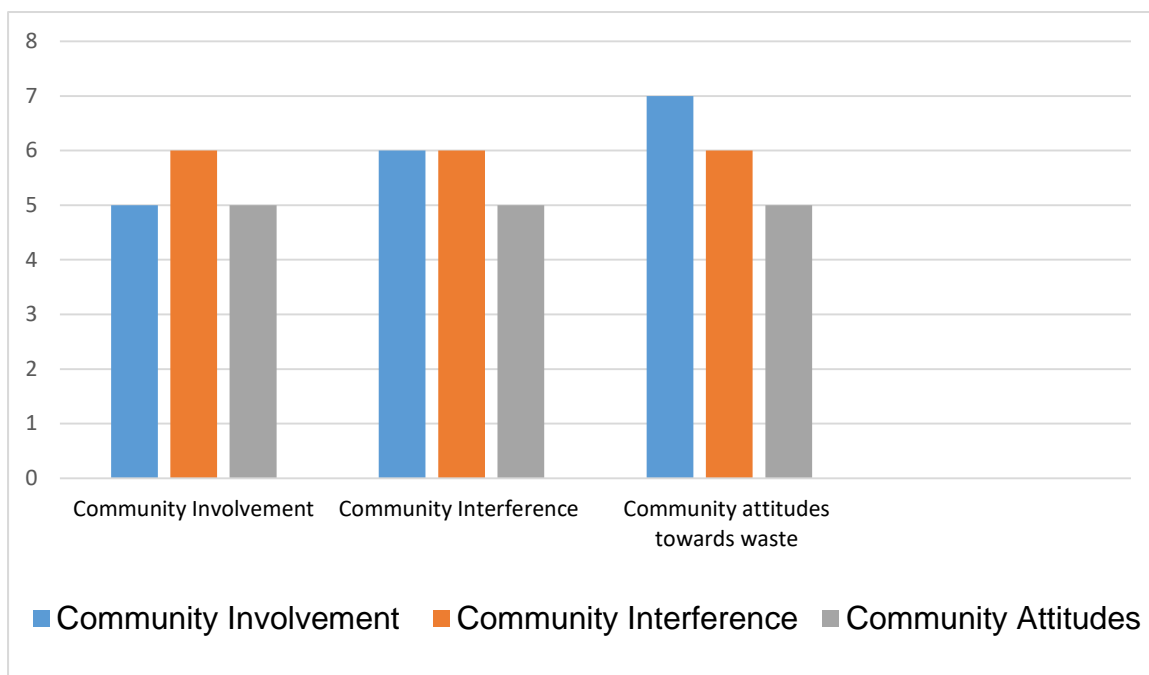


Figure 11: Community Involvement and Participation

The respondents indicated that they do enter into partnerships with community and private structures to promote cleanliness and recycling of waste. Through EPWP programmes the city has also managed to provide short-term employment opportunities for community members. This therefore demonstrates that innovative and collaborative approaches to waste management can, potentially, contribute to the alleviation of socio-economic challenges that are faced by communities.

Three respondents did indicate that community involvement has had a negative impact on their operations since considering that scavengers have taken over the operations at the Heatherly Landfill site. They noted difficulties in managing the site and ensuring compliance with by-laws and accessibility to all users. This also refers to a lot of illegal recycling depots established within residential areas without the necessary approval from the city. Furthermore, some 07 respondents also cited community interference where local community members and structures, such as business forums, hijack the delivery of waste management services from the appointed waste management services providers of the City of Tshwane. This has resulted in the disruption of waste services. ***Quoting one of the respondents “waste management services is held***

ransom by individual commercial interest disguised as community organisations” This situation has become a norm in townships and has had a negative impact on service delivery.

Godfrey (2008), Savage (2009), and The Centre for Environmental Management (2012) among others, have emphasized the essential waste management functions which the officials of the municipalities of South Africa have to play in creating the enabling environments for the effective management of waste in the urban centres of South Africa. It is clear that the municipality as an authority and custodian of waste management resources like landfill site has lost control of such resources and thus neglecting their constitutional obligation to ensure that all residents live in a healthy environment.

Whilst the above challenges cannot be condoned and it is equally critical to note that the non-involvement or participation of community organisations and structures in waste management services has a huge potential to result in waste management crisis for the city and its communities. Participation is not only about drawing all stakeholders in a policy, programme or project together to assure its appropriateness and assist in its implementation. Participation processes must address the differential costs and benefits of privatisation and be prepared to host conflicts over differing interests that are at stake. It is easy to demonstrate that the primary risk associated with municipal infrastructure privatisation is that low-income people will receive substandard, unaffordable services (Hemson, 1997). The fact that informal settlements do not receive waste bins and do not have consistent house to house or skip waste collection services because they cannot afford to pay for the service is a classic example in this regard.

Swilling and Hutt (1999) have reported that door to door collection of solid waste several times a day as well as incentives are essential for maintaining cleanliness and environmental sanitation especially in busy streets and taxi ranks where large numbers of people congregate. According to Swilling and Hutt (1999) it is helpful and wise to provide incentives to members of the community who lead by example in terms

of the collection and proper disposal of waste. In many developed nations of the world, ordinary citizens pay due attention to cleanliness, proper waste disposal and the efficient utilization of municipal services such as waste disposal. However, it is unfortunate to note that the city's policy framework is punitive focused as opposed to being complimentary and encouraging a clean society. This means that the city's policy framework should incentivise communities that show commitment to minimising waste in their households or community. Poor communities in the peri-urban areas like Hamanskraal (Region 1), Mabopane (Region), Refilwe (Region 5) and Zithobeni (Region 7) will, arguably, support programmes that address their current socio-economic challenges. Offering residents an opportunity to recycle their waste in return for discounts on their property rates or service can serve as a strong incentive to encourage residents to use waste materials to subsidise their basic expenses.

Teo and Loose (2001) found that attitudes towards waste reduction have become one of the reasons behind the difficulties encountered in the management of waste. They highlight the importance of human factors in the minimisation of waste, and argue that waste can be prevented by changing people's attitudes.

Often government tends to have aspirations that are not communicated and lobbied within communities. This often results in well thought and positive ideas being rejected by the communities due to the lack of education and awareness that has been conducted with the community with a view to change the communities approach or attitude towards waste management.

It is clear that from the data that was generated that above response the city needs to implement its green economy framework that will create economic development opportunities within the waste management sector. Indeed, it is critical to regulate community members in a manner that does not discourage their recycling efforts but ensures that they are conducted in a manner that will not harm communities or the environment. The process can include provision or leasing of land to community cooperatives that engage in recycling. Such opportunities will allow communities to undertake their recycling activities in a demarcated and controlled environment thus

limiting the negative consequences to the community or the environment. Furthermore, reclaimers can be encouraged to establish structures that improve their ability to interact with local government and other role players.

5.4.4 How can other structures such as communities and organisations work with the city to improve waste management services delivery?

The respondents indicated that they are responsible for community and stakeholder liaison. According to the respondents the city's waste management services is busy with processes of establishing waste management structures at all communities that will focus on different aspects of waste management i.e. recycling, landfill sites and environmental awareness. The intention is to ensure that the community is closely involved in the waste management value chain and can also benefit from such a process.

Respondents from the regions believe that involvement of the communities is critical to bringing an efficient and stable waste management service in their respective regions. Federico et al (2009) emphasise that ensuring efficient waste removal and disposal in large metropolitan cities requires commitment from all stakeholders. Health education, door-to-door campaigns, legislation as well as incentives can be used for ensuring efficiency in waste collection, removal and disposal (Khan, 2009).

Informed communities are better positioned to provide the necessary support and cooperation in the management of waste. Community members cannot separate their waste at source if they are not empowered with information on why they should separate their waste and also provided with the necessary resources. The current situation in the city is that more than 90 percent of the waste that goes to the landfill is unsorted. The method of handling, storing and processing of solid wastes at the sources plays an important role in public health, aesthetics and efficiency of municipal solid waste management system (Abdoli, 1995). Due to current socio- economic challenges experienced largely in regions, 01, 02, 05 and 07 it is clear that waste

management services can also be used to mitigate the high unemployment and poverty levels of these regions.

5.4.5 Do you think that the required institutional capacity is available in the city to provide waste management services? Please explain?

All respondents indicated that the city does not have the capacity to properly fulfil its waste management obligation. According to two respondents, the current staffing complement of the Waste Management Service is at just 50% which is unacceptable for a statutory function and critical service like waste management services.

There were 10 respondents who indicated that the city is also losing highly competent waste management professionals to other municipalities due to uncompetitive salaries and limited opportunities for career progression within the city.

It seems that the existing budget allocation does not match the cost of rendering a service. Such a principle should also apply in the creation and implementation of waste management services tariffs. Currently, the city does not levy tariffs that are consistent with its expenditure on services. One of the objectives of the Section 78 process should be / is to develop a waste management entity that will have an institutional model that is practical and relevant to the waste management sector. This will result in the development of unique waste management processes and market related salary structures and capacity.

5.4.6 Do you think that the city has enough infrastructures to deal with waste management challenges? Why?

The majority of the respondents did not think that the city has the sufficient infrastructure to deal with waste management challenges. They indicated that the city needs more than the five landfill sites that currently exist. These landfill site are far from communities and thus result in huge fuel and fleet costs to the city. The ageing waste management fleet often means breakdowns that disrupt waste collection

schedules. According to Godfrey (2007), communities and municipalities suffer from a chronic inadequacy of waste management resources. Whilst this can be commonly accepted, it is unsustainable that the city still disposes over 90% of its waste at landfill sites. This is against its own IWMP and the National Waste Management Strategy and Polokwane Declaration. In order to mitigate this potential catastrophe the city has to aggressively undertake waste minimisation programmes to ensure that it manages the waste services before the lifespan expiration of existing landfill sites expires.

5.4.7 What are the mechanisms that can be put in place to address the basic service delivery challenges with regards to waste management in the city?

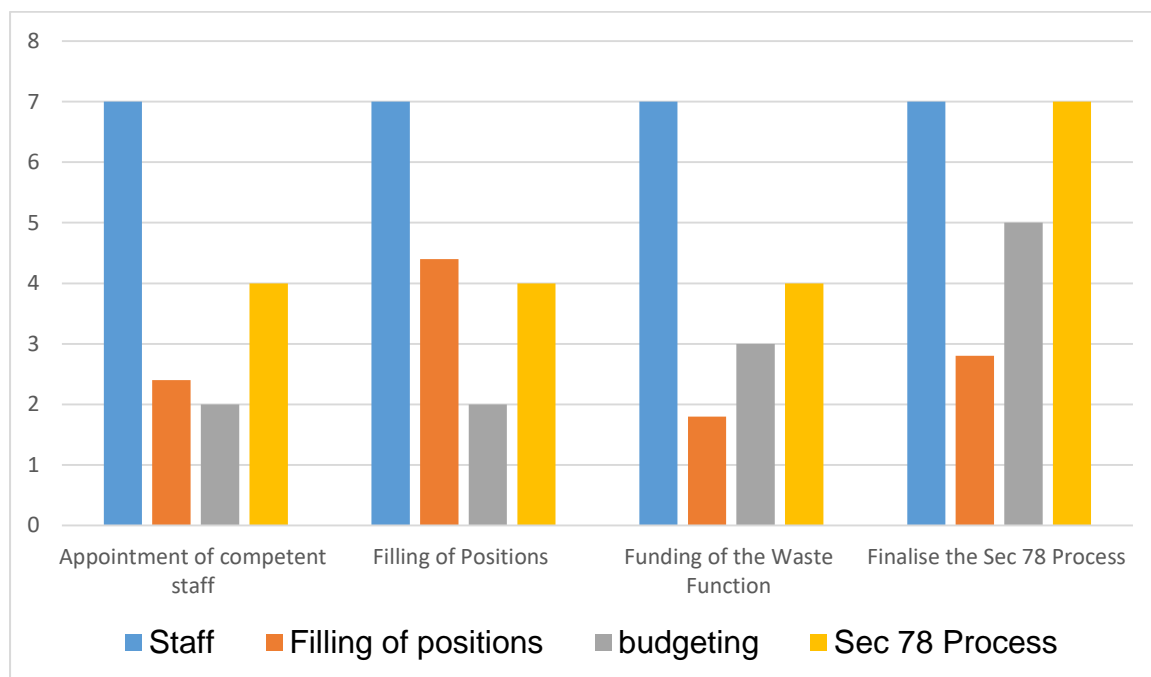


Figure 12: Mechanisms to address Waste Management Challenges

The respondents cited a number of interventions like appointment of competent and qualified staff, filling of vacant positions and adequate funding of the Waste Management Division. However, four respondents emphasised the need to finalise the Section 78 process of converting the Waste Management Division to be a municipal entity with its own board to ensure its depoliticization and efficiency. Respondents cited that the enforcement of municipal waste by-laws, with particular attention to

illegal dumping by major chemical and construction companies is critical. All respondents agreed that greater civil education and awareness is an appropriate long term solution to addressing the city's waste management challenges.

It is clear that there are potential solutions for addressing the current waste management challenges of the city exist. However, from analysing the responses from the respondent, it is obvious that there is a lack of capacity and political will to implement these interventions. It is envisaged that the new political administration will have the political will to drive these solutions and ensure greater improvement of the waste services in the city.

5.4.8 In your opinion, has the municipality done enough to eradicate the past imbalances in the provision of basic services such as waste management? Please explain your answer.

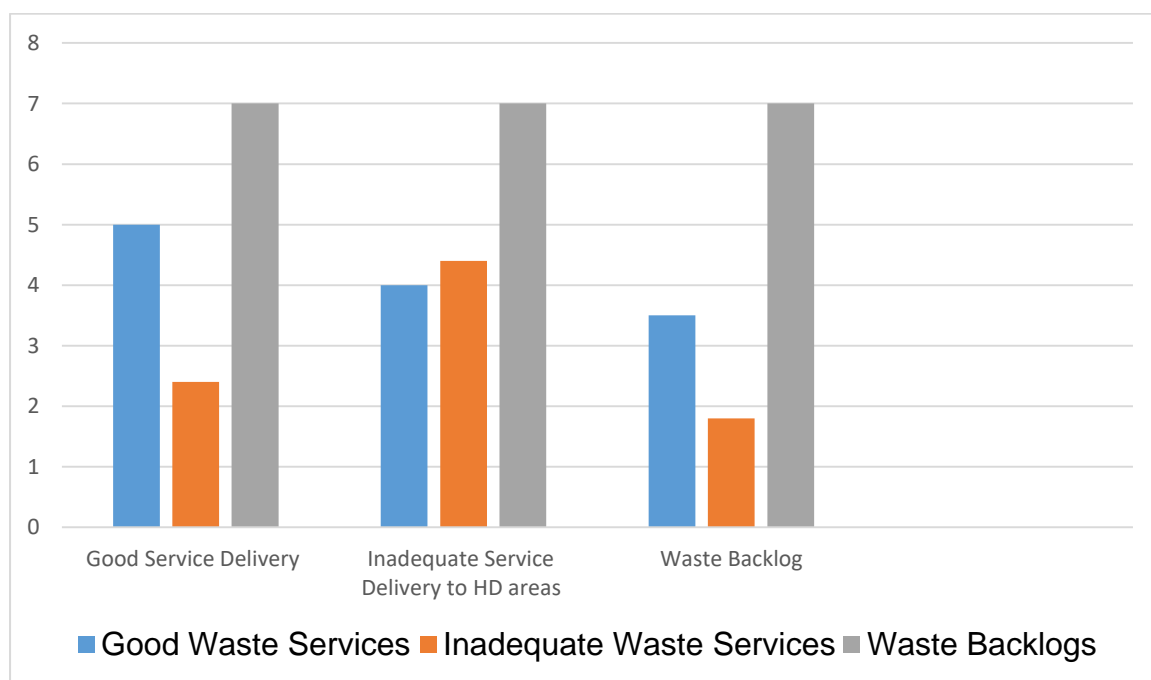


Figure 13 The Performance of the CoT to improve Waste Management

The majority of the respondents, as shown in figure 14, believe that under challenging circumstances the Waste Management Division has done a lot in the implementation

of the 240 litre bin programme and use of SMME's in the delivery of waste services in previously disadvantaged areas.

However, five of the respondents were of the view that the city has not done much to address the waste challenges considering that new communities have emerged but the waste division is still being resourced under the old budget. This has resulted in illegal dumping, and dirty and unhygienic spaces.

In South Africa the historical backlog of waste services, especially for urban informal settlements, tribal areas and rural formal areas, has created illegal dumping problems (Department of Environmental Affairs, 2010). The historical backlog of waste services has led to unpleasant living conditions, and unhealthy and contaminated environments. This backlog, created prior to 1994, will be compounded by the rapid and high influx of people from other provinces and countries who are seeking employment or better economic opportunities. This is a clarion call for the relevant authorities to rapidly tackle the city's waste management challenges.

Case studies like those of the Latin American countries – such as – where waste is managed by the community members who collect and store it in skips that are taken to waste disposal sites can provide valuable lessons and the community members are paid to carry out such duties (Holmes, 1982). This practice has resulted in effective waste collection in congested communities, an improvement of their quality of life through the income generated from such services and healthier environments.

Highly affluent communities as well as poor communities exist in South Africa. Differentiated service provision according to levels of affluence in suburbs might therefore be necessary. Affordable, yet adequate services can be made available to the poorer communities while more affluent communities can be provided with services at a premium price point. There is an expectation that in Tshwane or South Africa in general, service provisions to all households have to be on the same level, without discrimination. However, the reality indicates that this does not happen as

waste management services are regarded to be delivered according to the ability to pay the levies, which is contrary to the poverty alleviation principles set by the Government (Berger, 2007).

It is critical to accept that Tshwane functions as a capitalist model of service delivery which is influenced by cost recovery and profit. This is becoming evident when one observes the unequal service delivery provisions in affluent areas of the city like in region 03, 04 and 06. In simple terms, the city with its limited resources prioritises residential that can afford to pay for their services since local government generates +/- 80% of its revenue from its own services. This method will never succeed in addressing the imbalances of the past and perpetuates a class model of service delivery. This perception is further supported by Zurbrugg (2003) who observes that municipal waste management collection schemes of cities in the developing world generally served only a limited portion of the urban population. It is the low-income areas located in the peripheries of the city that often have the worst waste management services.

5.5 DOCUMENT ANALYSIS

Document analysis is often used because of the many different ways it can support and strengthen research as either a primary method of data collection or as a compliment to other methods. (Bowen, 2009).

It is a social research method and is an important research tool in its own right, and is an invaluable part of most schemes of triangulation, the combination of methodologies in the study of the same phenomenon (Bowen, 2009). In order to augment this waste management study the researcher has chosen to add document analysis as part of the research model. The primary objective would be to try and corroborate the researchers sources i.e. subject documents and sampled respondents for the research. It is always credible to have evidence that is sourced and backed by different sources instead of reliance on only one source. Beyond interviews with respondents, the researcher also identified the following public records with a view of analysing their

effectiveness in contributing towards a positive waste management solution for the city.

5.5.1 Government Reports

Waste Management as a service is a regulated government service that has been assigned to local Government under the constitution of the Republic of South Africa. Government documents therefore provide essential information on the thinking behind waste management processes and on the formulation and implementation of plans.

5.5.1.1 Census 2011 report on Waste Management in the City of Tshwane.

According to the 2011 Census report the City of Tshwane has managed to increase its waste management services to 76% of households in 1996, to 78,7% in 2006 and 82,0% in 2011. This is considerable in the context of historical service delivery backlogs as a result of the apartheid system and poor waste services in black communities.

However, it is important to mention that compared to the other two Metropolitan Municipalities in the Gauteng Province, The City of Tshwane is behind the City of Ekurhuleni (89% in 2011 and City of Joburg (97% in 2011) in the provision of waste management services.

It should be noted that in 2011 the Metsweding District Municipality was amalgamated with the CoT. This was an added responsibility to the CoT. The waste management system in the Metsweding area was described in 2005 as “fragmented with frequent vehicle breakdowns, whilst the landfills do not conform to DWAF’s Minimum Requirements” (Metsweding District Municipality, 2005). Recycling took place on an ad-hoc informal level at the landfills as well as through informal picking from refuse bins in the more formalised areas. The Metsweding IWMS estimated that 33 660 tons of waste would have been generated in 2005, consisting of 10 100 tons building waste, 4 170 tons garden waste, and 4 690 tons recyclable waste. (City of Tshwane Integrated Waste Management Plan 2014).

5.5.1.2 City of Tshwane Annual Report 2016/17

According to the City of Tshwane Annual report 2015/16 the city opted to implement a regionalised system of service delivery which aims to bring service delivery closer to the local communities. Waste collection is one of the waste management functions that is operated and managed by regional administrative structures. The Central Department of Environmental Management Services is responsible for policy, strategy, norms and standards.

The report further indicates that Tshwane's refuse collection service coverage has improved significantly over the last decade. In regions 01, 02, 05 and 07 the provision of bags and bins across the city accelerated waste collection. Towards the end of the previous political councils term (2011 – 2016) the city was collecting refuse from more than a million service points every week.

The city also decided to progressively standardise its household waste collection service into one where households will make use of 240 l wheelie bins. This was meant to reduce illegal dumping of general waste, especially from the previously-disadvantaged areas where households found themselves with no option but to illegally dump household general waste on the road sides and open spaces. Smaller receptacles could not accommodate their waste volumes in between collections.

Another important milestone in the city's waste management performance was the delivery of an additional 30 480 bins, with a capacity of 240l each, to households which took the tally to 83 598 bins in the council's term. In addition to addressing the service delivery needs of the consumers, this project has contributed significantly to the waste management revenue which increased from R541,7 million in 2011/12 to R1,9 billion in 2015/16.

However, the project did face a challenge where some communities complained about the affordability of the service where they have to pay bin tariffs. This was addressed

through the approval of a rebate policy where households in properties of less than R350 000 in value will pay half the tariff. The indigent are exempted from payment.

In June 2016, the Municipal Council approved a City of Tshwane Waste Management by-law which is aligned to the provisions of the Waste Act, as well as the National Waste Management Strategy. This was because the old by-law lacked alignment to the national policy and legislative prescripts. It was found to be weak on enforcement, including on penalties for breaking the by-laws and on facilitating by-law enforcement.

Amongst the consequences of by-law's weaknesses was the scourge of illegal dumping in the city and the inability to enforce waste separation at source by consumers – which is key to the implementation of the waste hierarchy.

These challenges necessitated the revision of the Waste Management by-law in order to effect stronger compliance enforcement provisions, be able to foster an environment that allows for alternative waste management initiatives, and drive the focus away from the traditional approach of collecting and disposing of waste at landfill sites.

The city partnered with the Department of Environmental Affairs (DEA) to develop and refurbish five waste buy-back centres. Three of these buy-back centres, which were refurbished in Atteridgeville, Stinkwater and Hammanskraal, were launched in the 2015/16 financial year. Two new buy-back centres in Ga-Rankuwa and Soshanguve are in the construction phase.

The city also approved the Green Economy Framework in 2016 and the Tshwane Vision 2055 in 2014. The development and adoption of these documents demonstrated the city's commitment towards exploiting the economic potential of the waste sector whilst ensuring a clean environment. However, despite all these efforts the city has not moved with speed to implement all its plans. This can be attributed to lack of capacity, planning and resources.

5.5.1.3 Journals on Waste Management

Rapid population growth as a consequence of economic growth and urbanisation has created waste challenges for the cities due to the high volumes of waste generated

(Minghua et al., 2009). As a result of this phenomena municipalities face a huge challenge of providing quality waste services to a rapidly growing population with stagnant and limited resources.

Increasing population levels, booming economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries (Minghua et al., 2009). Municipalities, usually responsible for waste management in the cities, have the challenge to provide an effective and efficient system to the inhabitants.

This argument by Minghua et al (2009) is relevant in the city's context considering the significant influx of people from neighbouring provinces and countries in search of better economic opportunities. Whilst this natural phenomenon is expected, it is always difficult to provide services to a growing population with shrinking resources. Municipal authorities often face problems beyond the ability of the municipal authority to tackle mainly due to lack of organization, financial resources, complexity and system multi dimensionality (Burntley, 2007).

The city's population increased from 2.1 million people in 2001 to 2.9 million in 2011 and is projected to continue increasing over time due to migration of people from the surrounding provinces to Gauteng in search of economic opportunities albeit at a slower rate. Also, the City of Tshwane's population can in part be explained by the incorporation of the Metsweding region and its local municipalities.

Inadequate supply of waste containers and longer distance to these containers increase the probability of waste dumping in open areas and roadsides relative to the use of communal containers. Insufficient financial resources limiting the safe disposal of waste in well-equipped and engineered landfills and absence of legislation are mentioned by Pokhrel and Viraraghavan (2005). This is evident in the peri urban regions of the city and unless alternative methods of waste management are implemented this situation will not improve. One can argue that the city through its programme of supplying 240L bins is responding to the need for waste containers,

such an initiative should not be looked at as the only solution but a short term measure whilst recycling and waste minimisation interventions are still to be implemented.

In relation to recycling Gonzalez-Torre and Adenso-Diaz (2005) reported that social influences, altruistic and regulatory factors are some of the reasons why certain communities develop strong recycling habits. The researcher agrees with Gonzales – Torre and Adenso- Diaz (2005) on the above argument in that one of the critical waste management responsibilities of the municipal authority is the development and enforcement of by-laws. It has been proven that punitive by-laws that do not seek to incentivise the communities do not have significant influence to recycling or positive waste management initiatives by the community. We have observed the positive impact of a progressive legal framework in Sweden which promotes recycling and creating value and economic development opportunities through Waste Management.

It is therefore necessary and critical for the city to encourage its communities to participate in recycling initiatives to create job opportunities for themselves. However, the city in partnership with private sector companies must create a platform for such an initiative. Minghua et al. (2009) stated that in order to increase recycling rates, the government should encourage markets for recycled materials and increasing professionalism in recycling companies. Other factors mentioned by other scholars are financial support for recycling projects and infrastructures (Nissim et al., 2005), recycling companies in the country (Henry et al., 2006), drop-off and buy back centres (Matete and Trois, 2008) and organization of the informal sector (Sharholy et al., 2008).

It is government's responsibility to create an enabling or conducive environment for sectors to thrive. Therefore, besides its constitutional mandate to deliver waste management services, the city has an opportunity to create a progressive environment for informal waste workers to ensure an integrated waste approach between the community, private sector and local government as argued by Sharholy et al., (2008).

5.6 CONCLUSION

The definition of a basic service, as put forward by the Municipal Systems Act 32 of 2000 (Republic of South Africa, 2000), is “a municipal service that is necessary to ensure an acceptable and reasonable quality of life and, if not provided, would endanger public health or safety or the environment”. As mentioned before, insufficient waste collection poses a risk to the environment and to human health (Medina, 2005). A lack of collection services leads to improper methods of waste disposal, which has a negative environmental impact and increases the risk of contracting and spreading infectious diseases (Murad & Siwar, 2009).

It is clear from the conducted research that the city has developed the necessary plans, policies and strategies to address its waste management obligations in accordance with its constitutional obligations. However, what has been an obstacle in the implementation of these plans is the lack of human and financial resources for the waste management services. Internal institutional arrangements for poses serious process challenges for the division which has been mandated with a statutory function like waste management.

One of the observation made during the research was that most of the developed strategies and policies of the city were developed by consultants. This is worrying in that consultants are private companies with particular business interests. The lack of a waste management information system that will serve as an intelligence port of the city on waste management services is also another issue of concern.

Waste management in any city involves a large number of different stakeholders, with different fields of interest. They all play a role in shaping the city's system but often waste management is seen as the responsibility of the local authorities. In the best of the cases, the citizens are considered co-responsible together with the municipality. Detailed understandings on who the stakeholders are and the responsibilities they have in the structure are important steps in establishing an efficient and effective system. Communication transfer between the different stakeholders is of high importance in order to have a well-functioning waste management system in the city.

The current community challenges can be directly linked to the lack of close working relations between the community and the city. This has resulted in conflict that has had a negative impact on the service delivery of waste services in the City of Tshwane, particularly in regions 1, 2, 5 and 7.

Waste management is a multi-dimensional issue and the city has attempted to invest in equipment i.e. fleet trucks – as a path to finding solutions to the diverse problems it encounters. This study shows that an effective system is not only based on technological approaches but also environmental, socio-cultural, legal, institutional and economic linkages that should be present to enable the overall system to function. Solid waste services have a cost attached to them, just like other services provided, but in general the expenditures are not recovered by the city due to various socio-economic issues within the municipal area.

The city requires resources such as skilled personnel, appropriate equipment and infrastructure, proper maintenance and operation. The financial support of the city and political will of its leaders in waste management issues, the participation of the service users and the proper administration of the funds are essential for a modernized and sustainable system.

CHAPTER6: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

6.1 INTRODUCTION

This chapter provides a synopsis of the study findings. The impact of implementing waste management policy in the City of Tshwane is a critical legislative obligation which must be addressed to ensure fulfilment of constitutional obligations and status as a capital city. It is envisaged that the findings and recommendations of the study will have a significant positive impact in improving waste management services.

6.2 SUMMARY OF THE FINDINGS

6.2.1 Lack of human resources and funding

The driving force behind efficient service delivery is a well-resourced and capacity public sector service delivery business unit. During the research all respondents raised the human and funding resource challenge as a critical contributor to the city's waste management challenges. The staffing capacity for this statutory service is said to be below 50%. This challenge necessitate that urgent measures be put in place to urgently address the lack of human and funding challenges for the service.

6.2.2 Lack of community involvement in waste management programmes and solutions

Teo and Loose (2001) found that attitudes towards waste reduction have become one of the reasons behind the difficulties encountered in the management of waste. (Loose more et al. (2002), highlight the importance of human factors in the minimisation of waste, and argue that waste can be prevented by changing people's attitudes. This simply means that the City of Tshwane can develop waste management strategies and policies for the community but if such plans and policies are not intended to educate and change the community's attitude and culture towards waste, these will be in vain. This has been demonstrated by the lack of community involvement in the

waste management services of the city. This has resulted in the community members illegally taking over the Heatherly Landfill to operate as reclaimers. The Community Business Forums which have business interest in the waste management business are also “hijacking” waste services.

This is a symptom of a lack of proper engagement and collaboration between the city and the community to jointly plan and implement waste services with a view of keeping a clean environment whilst at the same time exploiting the economic potential of the waste management sector. Community participation during planning and implementation of a communal waste collection system is therefore critical (Doan, 1998).

6.2.3 Institutional deficiencies

The City of Tshwane has implemented a decentralised regional service delivery model. According to this model normal day to day waste services is managed and implemented at regional level. The Head Office deals with policy and capital infrastructure development. Furthermore, the waste management services function is actually a division within a department that includes Environmental Management, Parks and Cemeteries. This institutional arrangement has resulted in the services not even complying with the Waste Management Act to appoint a Chief Waste Officer. This has resulted in the management of this crucial service within a divisional context. The outcome is inadequate attention, capacity, budget and human resources.

6.2.4 Lack of policy and strategy implementation

The City of Tshwane has managed to develop and approve an integrated waste management plan, update its waste by-laws and approve a green economy framework. All these approved documents are aligned to the National Waste Management Act and Waste Management Strategy. However, what became evident during the research and document analysis was that all prescribed plans on the integrated waste management plans were not implemented and the by-laws were not enforced. This demonstrated that the city was having a challenge with implementation or enforcement instead of having a policy or strategy vacuum.

6.2.5 Political interference

The city as a tier of government is not immune to political influence and interference. This often results in the waste management services being used for political agendas. Key programmes like the extended public works programmes that were intended to offer short term employment to community members have in some cases been used as political instruments. It is for this reason that a proper institutional arrangement for the waste department is established to mitigate the political interference and ensure that professionals and boards with the necessary technical and governance capacity manage the city's waste services.

6.3 RECOMMENDATIONS OF THE STUDY

The study has managed to identify underlying sources of the waste management challenges in the City of Tshwane. In order to finding solutions to such challenges the researcher is proposing the consideration and implementation of the following recommendations.

6.3.1 Establishment of a waste management entity for the City of Tshwane

The underlying source of the challenges facing the City of Tshwane's Waste Management Services is the lack of capacity and resources. This challenge is largely created by the current configuration of the waste management division within the Environmental Management Department. In order to address this challenge the city can aggressively accelerate the creation of a municipal waste services entity with proper management. The entity should have the powers to appoint competent and qualified staff members to run the entity and deliver efficient services to the public. This entity will operate outside the cumbersome bureaucratic and political process of the city. It must be noted that the City of Tshwane is looking at the process as part of its implementation plan for the Integrated Waste Management Plan.

6.3.2 Recognition and partnership with community waste structures

The emergence of recyclers and reclaimers is a phenomenon that the City of Tshwane should embrace since it can be part of the solution to the city's waste management challenges. Organising reclaimers at landfill sites to ensure that they operate in a safe environment is key to ensuring sustainability. Offering reclaimers safety equipment and clothing will be an incentive to ignite interest waste management activities. Furthermore, it is critical for the city to amend its supply chain management policy to create opportunities for community cooperatives to conduct waste management services within the city. Another important element is for the city to assess and research the unique characteristic of a particular region in relation to its cultural, technological, environmental, political and economic profile with a view to developing targeted and specific interventions. A one-size fits all approach will not work due to the heterogeneous nature of the seven regions of the city. Once a waste management plan for a specific region has been developed in collaboration with the community, it is recommended that consistent education and awareness programmes be implemented with the community to create awareness on the plan and encourage the community to keep their area clean and participate in waste management activities. The cleaning campaign by the community of the City of Kigali over weekends is a good example of such efforts and the outcome of community and government partnership. It is further recommended that partnerships be established with local retailers to create an incentive scheme where community members can get grocery vouchers for recycled waste that is redeemed at identified recycling transfer site.

6.3.3 Policy implementation and by-law enforcement

Respondents indicated that the city's waste legal framework and strategies are developed but not implemented or enforced. This is caused by the lack of capacity, functional ambiguity on by-law enforcement and lack of political will. It is recommended that waste management by-law enforcement be delegated to environmental health officers who have the requisite qualifications and expertise to enforce waste by-laws. Furthermore, it is recommended that the Waste Management Division be capacitated

with qualified waste scientist who can ensure the review and implementation of waste policies and strategies.

6.3.4 Invest in waste to resource technology

With increasing population and standards of living, the accumulation of waste will persist. It is for this reason that the city needs to invest in research to investigate options for value creation through using waste as an energy source, product or service source.

The development of waste to energy plants will mitigate the rising cost of energy whilst at the same time addressing the Waste Challenge. Sweden as indicated under Chapter 03 of the study is selling its waste to other countries due to their technological innovation to convert waste into a resource.

6.3.5 Discourage landfilling through high landfilling charges

The City of Tshwane has the power to discourage landfilling through increased charges. High costs of landfilling will definitely discourage their usage and will encourage users to use transfer centres to redeem their recycled waste for food vouchers or at waste to energy plants to be used as an energy source.

6.4 LIMITATIONS OF THE STUDY

This study was only limited to the City of Tshwane waste management officials and Regional Directors and did not have include community members or leaders as beneficiaries of the city's waste services. The study was intended to understand the implementation of waste management policy in the City of Tshwane and focused on the peri urban regions of the study affected by lack of waste management services. The study does not represent the views of all the waste management officials of the city. In some instances sampled officials could not be met due to pressing work schedules.

6.5 CONTRIBUTION OF THE STUDY

This study makes a contribution to the field of public administration with specific emphasis on waste management services. The research provides insight into the causes of this phenomenon by investigating service delivery policies, strategies and plans of the City of Tshwane.

In order for the city to develop and implement measures to address its waste management services challenges, particularly in its peri urban areas that are the subject of this study, it has to understand the underlying sources of its waste challenges. It is hoped that the diagnosis provided by this study will assist the city to understand its underlying sources and, based on these identified sources, develop and implement sustainable waste management solutions.

6.6 CONCLUSION

It must be noted that whilst outlining the findings of the research specific recommendations have also been outlined that will seek to assist the city with solutions to their waste management challenges. Some of the recommended actions include allocation of budget resources, appointment of qualified and competent officials, involvement and partnership with communities, Investment in technological solutions and establishment of a waste management entity. Implementation of these recommendations will address the waste management challenges of the city and mitigate against consequences. Furthermore, it is envisaged that this research will contribute to the generation of knowledge that can be used to address waste challenges in the city and other public entities.

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ANNEXURE A

**UNIVERSITY OF SOUTH AFRICA
PUBLIC ADMINISTRATION AND MANAGEMENT
ETHICS REVIEW COMMITTEE
ETHIC CLEARANCE APPROVAL**

**DEPARTMENT: PUBLIC ADMINISTRATION AND MANAGEMENT
RESEARCH ETHICS REVIEW COMMITTEE**

Date: 2 December 2016

Ref #: PAM/2016/035 (Mokebe)
 Name of applicant: Mr T Mokebe
 Student #: 33241902

Dear Mr Mokebe

Decision: Ethics Clearance Approval

Name: Mr T Mokebe, Thabomokebe7@gmail.com, tel: 082 782-7120

[Supervisor: Mr BC Lekonyane, 012 429-6116, lekonbc@unisa.ac.za]

Research project: The implementation of the waste management policy in the City of Tshwane Metropolitan Municipality **Qualification:** MPA

Thank you for the application for **research ethics clearance** by the Department: Public Administration and Management: Research Ethics Review Committee, for the above mentioned research. Final approval is granted for the duration of the project.

The decision will be tabled at the next College RERC meeting for notification/ratification.

For full approval: The application was **expedited and reviewed** in compliance with the Unisa Policy on Research Ethics by the RERC on 2 December 2016. The proposed research may now commence with the proviso that:

- 1) The researcher will ensure that the research project adheres to the values and principles expressed in the Unisa Policy on Research Ethics.
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to this Ethics Review Committee. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.
- 3) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

Kind regards,


Prof Mike van Heerden

Chairperson:
 Research Ethics Review Committee
vheerm@unisa.ac.za


Prof MT Mogale

Executive Dean: CEMS

University of South Africa
 Preller Street, Muckleneuk Ridge, City of Tshwane
 PO Box 392 UNISA 0003 South Africa
 Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

ANNEXURE B

**CITY OF TSHWANE
APPLICATION AND APPROVAL LETTER TO
CONDUCT RESEARCH WITHIN THE CITY OF
TSHWANE METROPOLITAN MUNICIPALITY**

Thabo Mokebe
1461 Section D, Mamelodi West, 0122
082782 7120 - thabomokebe7@gmail.com

The Strategic Executive Director
City of Tshwane Metropolitan Municipality
Research and Innovation Department
Pretoria
0001

**REQUEST FOR PERMISSION TO CONDUCT RESEARCH ON IMPLEMENTING WASTE
MANAGEMENT POLICY IN THE CITY OF TSHWANE METROPOLITAN MUNICIPALITY**

Dear Madam

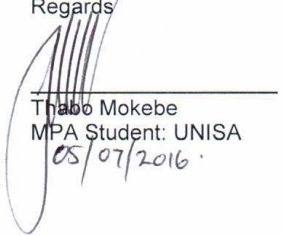
I am **Thabo Mokebe**, student number **33241902**, currently studying towards an MPA degree under the supervision of Mr B.C Lekonyane, a lecture at the University Of South Africa (UNISA), Department of Public Administration. The main objective of this research study is to identify challenges related to the implementation of waste management policies in the City of Tshwane Metropolitan Municipality.

I have developed a questionnaire that I will be using to collect primary data from selected participants. Therefore I would like to request your permission to obtain information from senior and middle management at the City of Tshwane Metropolitan Municipality.

Personal information will not be required or disclosed for this research and all provided information will be kept confidential and used only for purposes of this research study. Please find attached interview questions as Annexure A.

Kindly contact the researcher on Cell: 082 7827120 or landline: 011 999 3223, email: thabomokebe7@gmail.com should you require any additional information in this regard.

Regards


Thabo Mokebe
MPA Student: UNISA
05/07/2016



Office of the Deputy City Manager Governance and Support Services

20th Floor Isivuno House | 143 Lillian Ngoyi Street | Pretoria | 0001
PO Box 440 | Pretoria | 0001
Tel: 012 358 6251/4869 | Fax: 086 2148421
Email: FransBos@tshwane.gov.za | www.tshwane.gov.za | www.facebook.com/CityOfTshwane

My ref: Research Permission
Your ref:
Contact person: Zukiswa Ncunzana
Section/Unit: Integrated Research

Tel: 012 358 2000
Fax: 012 358 4464
Email: Zukiswano@tshwane.gov.za
Date: 25 August 2016

Re: Mr T Mokebe
1461 Section D
Mamelodi West
Pretoria
0122

Dear Mr Mokebe,

Approval to Conduct Research within the City of Tshwane Metropolitan Municipality

I have the pleasure to inform you that your request to conduct research on the topic ***"Implementing waste management policy, the case study of the City of Tshwane Metropolitan Municipality"*** has been reviewed and permission is hereby granted for you to conduct research in the City of Tshwane Metropolitan Municipality.

It is noted that the aim of your study is seeking to investigate service delivery policies, strategies and plans of the City of Tshwane in relation to waste management. In addition, please be informed that as a researcher you are required to sign the Confidentiality Agreement Form with the City prior data collection. Research and Innovation Department will be facilitating the whole process; therefore communication should be directed to this department.



Office of the Deputy City Manager

Once you complete your research in the City, you will be requested to present your findings and submit the final report/ a copy of your dissertation.

Yours faithfully



Frans Boshielo (Mr)

Deputy City Manager

Governance and Support Service

30-08-2016

Date

ANNEXURE C**PARTICIPANTS INFORMATION SHEET AND CONSENT
FORM**

PARTICIPANT INFORMATION SHEET

APRIL 2017

Title: Implementing waste management policy in the City of Tshwane Metropolitan Municipality

Dear Prospective participant,

The interview questions that you will be asked focus on Implementing waste management policy in the City of Tshwane Metropolitan Municipality

By taking part in the interview, you agree that the information you provide may be used for research purposes. You have been selected to participate in this survey because as an employee in management position, you have first-hand experience on issues affecting policies and decision making.

You are, however, under no obligation to be interviewed and can withdraw from the study prior to submitting the survey. Also note that the survey is developed to be anonymous and we as researcher(s) will have no way of connecting the information you provide to you personally. You will not be able to withdraw from the study once you have clicked the send button based on the anonymous nature of the study. If you choose to participate in this research it will take up no more than 30 minutes of your time. We do not foresee that you will experience any negative consequences.

The study will take into account the ethical considerations of conducting research. Nevertheless, the researcher(s) undertake to keep any individual information provided herein confidential, not to let it out of their possession, and to analyse the feedback received only on group level. The records will be kept for five years for publication purposes where after it will be permanently destroyed (hard copies will be shredded and electronic versions will be permanently deleted from the hard drive of the computer). It is hoped that the information we gain from this study will help us in understanding the basic service delivery challenges with regards to Waste Management Services in City of Tshwane. You will not be reimbursed or receive any incentives for your participation in this research.

Should you require any further information, want feedback on the study or need to contact the researcher about any aspect of this study, please contact Cell: 0827817120, landline; 011 999 3223 , email: thabomokebe7@gmail.com

CONSENT TO PARTICIPATE IN THIS STUDY

I, (participant name & surname), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

- I have read and understood the study as explained in the information sheet.
- I have had sufficient opportunity to ask questions and prepared to participate in the study.
- I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.
- I am aware that the findings of this study will be anonymously processed into a dissertation.
- I agree to complete the questionnaire/being interviewed.

Participant's name and surname

Date

Signature

Researcher's name and surname

Date

Signature

Witness name and surname

Date

Signature

ANNEXURE D**INTERVIEW QUESTIONNAIRE FOR SAMPLED
RESPONDENTS**

INTERVIEW QUESTIONS

Implementing waste management policy in the City of Tshwane Metropolitan Municipality

GENERAL INFORMATION

1. You have been invited to participate in this study because of your extensive experience about the topic under study.
2. The interview would take approximately 40 minutes.
3. You are kindly requested to answer the questions as honestly and completely as possible.
4. Participation is anonymous: You are not requested to disclose your identity.
5. Your privacy will be respected. No one will be able to connect you to the answers you give.
6. You have the right to withdraw your participation at any time.
7. You will not receive any payment or reward, financial or otherwise, and the study will not incur undue costs to you.
8. A copy of the final approved research study will be available in the library at the Muckleneuk Ridge Campus of the University of South Africa, Pretoria.

SECTION A: DEMOGRAPHICS

Please answer the questions below by ticking the correct answer in the box.

1. How long have you been employed in the City of Tshwane Metropolitan Municipality?

Less than 1 year		1-3 years		Between 3yrs - 5 years		5 years and above	X
------------------	--	-----------	--	------------------------	--	-------------------	---

2. What is your current level of employment?

Junior Management		Middle Management	X	Senior Management	
-------------------	--	-------------------	---	-------------------	--

3. What is your gender?

Male		Female	X
------	--	--------	---

4. What is your race?

Black	X	White		Coloured		Indian	
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SECTION B: INTERVIEW QUESTIONS-QUALITATIVE

1. What are the challenges experienced by the city in providing waste management services and policies?
2. How do the challenges affect the provision of waste management service delivery?
3. What is the role of other structures such as communities and organisations in providing waste management services?
4. How can other structures such as communities and organisations work with the city to improve waste management services delivery?
5. Do you think that the required institutional capacity is available in the city to provide waste management services? Please explain?
6. Do you think that the city has enough infrastructures to deal with waste management challenges? Why?
7. What are the mechanisms that can be put in place to address the basic service delivery challenges with regards to waste management in the city?
8. In your opinion, has the city done enough to eradicate the past imbalances in the provision of basic services such as waste management? Please explain your answer.

End of interview.

Thank you for your participation.

